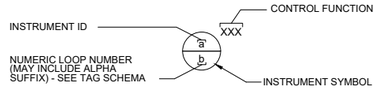
INSTRUMENTATION CALL - OUT



INSTRUMENT SYMBOLS

XXX a b — FIELD MOUNTED INSTRUMENT

XXX a b — FIELD MOUNTED SHARED DISPLAY/CONTROL

XXX a b — FRONT OF PANEL INSTRUMENT

XXX a b — CONTROL SYSTEM SHARED DISPLAY/CONTROL (ACCESSIBLE VIA OI / HMI)

XXX a b — INSTRUMENT MOUNTED WITHIN PANEL

XXX a b — CONTROL SYSTEM SHARED DISPLAY/CONTROL (ACCESSIBLE FROM WITHIN PANEL)

XXX XXX — SINGLE INSTRUMENT WITH MULTIPLE FUNCTIONS

I — RELAY INTERLOCK LOGIC

I — GENERIC SOFTWARE INTERLOCK / CONTROL LOGIC (NORMALLY ACCESSIBLE TO OPERATOR) *

I — GENERIC SOFTWARE INTERLOCK / CONTROL LOGIC (OPERATOR INACCESSIBLE) *

DATA ROUTING ARROW

CR — CONTROL RELAY

1 — ON-PAGE LOGIC LINK REFERENCE

SPD — LIGHTNING SURGE ARRESTOR

a — INSTRUMENT IDENTIFICATION / TAG NUMBER (SEE MODIFIED ISA TABLE FOR MORE INFO)

XXXV — PRIMARY ELECTRICAL POWER (e.g. 24VDC, 120VAC, 220VAC, 480VAC)

b — INSTRUMENT LOOP NUMBER

NOTE: IF INSTRUMENT POWER NOT INDICATED, REFER TO INSTRUMENT SCHEDULE FOR CONFIRMATION.

XXX — CONTROL FUNCTION

* REFER TO SPEC SECTION 409300 (PROJECT CONTROL PHILOSOPHY) FOR DETAILS.

PLC / REMOTE I/O POINTS

ANALOG INPUT | DISCRETE INPUT | DATA SIGNAL ANALOG INPUT * | DATA SIGNAL DISCRETE INPUT *

ANALOG OUTPUT | DISCRETE OUTPUT | DATA SIGNAL ANALOG OUTPUT * | DATA SIGNAL DISCRET OUTPUT *

* FIELD NETWORK INTERFACE. SEE SPECIFICATION FOR MORE INFORMATION

COMPUTING OR CONVERTING FUNCTIONS

COMPUTING

CONVERTING

Σ	SUMMING	D	DERIVATIVE
X	MULTIPLYING	A	AVERAGING
÷	DIVIDING	1:1	RATIO
√	SQ ROOT EXTRACTION	Δ	DIFFERENCE
P	PROPORTIONAL	>	HIGH SELECTING
J	INTEGRAL	<	LOW SELECTING
X^n	EXPONENTIAL	±	BIAS
▷	HIGH LIMITING	◁	LOW LIMITING
⌐	LINEARIZER		

E	VOLTAGE
I	CURRENT
P	PNEUMATIC
R	RESISTANCE (ELECT)
D	DIGITAL
A	ANALOG
B	BINARY
H	HYDRAULIC

CONTROL FUNCTION DESIGNATIONS

AHC	AUTO / HOLD / CLOSE	OLH	OFF / LOW / HIGH
AM	AUTO / MANUAL	O/O	ON / OFF
AS	AIR SUPPLY	O/R	OVERRIDE
BEAR	BEARING	OOR	OUT OF RANGE
CLSD	CLOSED	OSC	OPEN / STOP / CLOSE
CV	CONTROL VARIABLE	PID	PROPORTIONAL / INTEGRAL / DERIVATIVE
DEV	DEVIATION	POT	POTENTIOMETER
E-STOP	EMERGENCY STOP	PV	PROCESS VARIABLE
ETM	ELAPSED TIME METER	RDY	READY
FOR	FORWARD /OFF /REVERSE	R/L	RAISE / LOWER
HML	HIGH / MID / LOW	RSL	RAISE / STOP / LOWER
HOA	HAND / OFF / AUTO	RST	RESET
HOR	HAND / OFF / REMOTE	RTD	RESISTANCE TEMPERATURE DETECTOR
LEAK	MOISTURE INTRUSION	SD	SHUTDOWN
LOR	LOCAL / OFF / REMOTE	SEL	SELECT
L/R	LOCAL / REMOTE	SP	SET POINT
LSR	LOCAL / STOP / REMOTE	S/R	START / RESET
MOA	MANUAL / OFF / AUTO	S/S	START / STOP
MN	MAINTENANCE / NORMAL	STR	START
O/C	OPEN / CLOSE	STP	STOP
OCA	OPEN / CLOSE / AUTO	TMR	TIMER
OL	OVERLOAD	WIND	WINDING

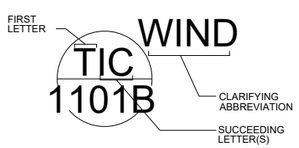
NOTE: 1. REFER TO DRAWING GI-2 FOR ANALYTICAL INSTRUMENT DESIGNATIONS.

ISA TABLE (MODIFIED)

	FIRST LETTER		SUCCEEDING LETTER(S)		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION				
C	CONDUCTIVITY			CONTROL	CLOSED
D	DENSITY	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			FORWARD
G			GAUGE, GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	MOISTURE	MOMENTARY			MIDDLE, INTERMEDIATE
N	TORQUE		ISOLATE	ISOLATOR	
O			ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		REVERSE
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	INTRUSION	X AXIS			
Y	EVENT, STATE, OR PRESENCE	Y AXIS		COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, FINAL CONTROL ELEMENT	

TAG SCHEMA

TYPICAL INSTRUMENT & CONTROL VALVE TAGGING



TYPICAL INSTRUMENT & CONTROL VALVE TAGGING

10-TIC-1101B – – INSTRUMENT SCHEDULE (FULL TAG)
TIC-1101B – – P&ID (PARTIAL TAG)
10 – – – – – – – PROCESS AREA
TIC – – – – – – INSTRUMENT / VALVE ID
1101 – – – TAG NUMBER
B – – SUFFIX

NOTE: REFER TO GENERAL SHEET I-02 FOR STANDARD SYMBOLS.

TYPICAL EQUIPMENT TAG FORMAT



10-P-1101B

TYPICAL EQUIPMENT TAG FORMAT

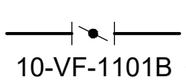
10-P-1101B – – EQUIPMENT SCHEDULE (FULL TAG)
10 – – – – – – PROCESS AREA
P – – – – – EQUIPMENT ID
1101 - – – TAG NUMBER
B – - SUFFIX

NOTE: REFER TO GENERAL SHEET I-03 FOR STANDARD SYMBOLS.

TYPICAL PIPE LINE TAG FORMAT (REFER MECHANICAL DRAWING M-01 AND M-02 FOR PIPE SPECIFICATION)

12"-RW (CS08) - - - - - PIPE LINE SCHEDULE (FULL TAG)
12" – – – – – – – – – – NOMINAL PIPE DIAMETER
RW – – – – – – – – FLUID CODE
CS08 - - - - - PIPE SPEC

TYPICAL VALVE TAG / SPEC FORMAT



10-VF-1101B — VALVE TAG

TYPICAL MANUAL VALVE TAG FORMAT

10-VLV-1101B– – MANUAL VALVE SCHEDULE (FULL TAG)
10 – – – – – – – PROCESS AREA
VLV – – – – – VALVE
1101 - – – TAG NUMBER
B – - SUFFIX

NOTE: REFER TO GENERAL SHEET I-03 FOR STANDARD VALVE CALLOUTS.

GENERAL INSTRUMENTATION NOTES

1. THE SYMBOLS AND NOMENCLATURE SHEETS ARE REPRESENTATIVE OF A GENERAL STANDARD. THEREFORE, IT SHOULD BE UNDERSTOOD THAT NOT ALL INFORMATION PRESENTED WILL BE RELEVANT TO THIS PROJECT.
2. ADDITIONAL INSTRUMENTATION AND CONTROL SYMBOLS MAY BE USED ASREQUIRED. SYMBOLS AND NOMENCLATURE WILL BE EITHER BASED ON ISA STANDARD 5.1-INSTRUMENTATION SYMBOLS AND IDENTIFICATION OR DEFINED ELSEWHERE IN THE P&ID SET.
3. SEE ELECTRICAL AND PROJECT GENERAL SHEETS FOR ADDITIONAL SYMBOLS AND ABBREVIATIONS.
4. TO CAPTURE THE COMPLETE PROCESS CONTROL INTENT, THE P&IDS MUST TO BE REVIEWED IN CONJUNCTION WITH THE PROJECT CONTROL PHILOSOPHY (SPEC SECTION 409010), THE PROJECT I/O AND INSTRUMENT SCHEDULES AND OTHER SECTIONS REFERENCED HEREIN.

INSTRUMENTATION LINE SYMBOLOGY

NEW WORK (UNSCREENED)

EXISTING (SCREENED)

EXISTING TO BE DEMOLISHED

FUTURE EQUIPMENT (DASH)

VENDOR SKID LIMIT

INSTRUMENT LINE DEFINITIONS (UNLESS SPECIFICALLY NOTED OTHERWISE PER DRAWING LEGEND)

DATA LINK OR SYSTEM BUS BETWEEN DEVICES

ELECTRIC (PULSE SIGNAL)

ELECTRICAL SIGNAL

ULTRASONIC SIGNAL

HYDRAULIC SIGNAL

MECHANICAL LINK

PNEUMATIC SIGNAL

PROCESS

AS — AIR SUPPLY

COMMUNICATION LINE DEFINITIONS (UNLESS SPECIFICALLY NOTED OTHERWISE PER DRAWING LEGEND)

UTP (CAT 5e OR CAT 6 AS NOTED)

P — P — PROFIBUS

F — F — FOUNDATION FIELD BUS

M — M — MODBUS (RS485)

SINGLE MODE FIBER

MULTIMODE FIBER

VENDOR SIGNAL CABLE

D — D — DEVICENET (THIN - DROP)

D — D — DEVICENET (THICK - TRUNK)

SIGNAL AND PROCESS OFF-PAGE CONNECTORS

PROCESS OR LOGIC CONNECTION TO DRAWING I-02 — I-02 (A)

PROCESS OR LOGIC CONNECTION FROM DRAWING I-02 — I-02 (A)

PROCESS OR LOGIC CONNECTION TO/FROM DRAWING I-02 — I-02 (A)

PROCESS OR LOGIC CONNECTION CONTINUES TO UNREPRESENTED DRAWING

NOTE: REFER TO INSTRUMENTATION LINE SYMBOLOGY FOR PROCESS AND LOGIC LINESTYLE DEFINITION.

Stantec

BOWEN COLLINS & ASSOCIATES

PROFESSIONAL ENGINEER — No.11965314 — BARBARA CHOPADE — 12/13/22 — STATE OF UTAH

NO.	DATE	REV. BY	DESCRIPTION
			REVISIONS

MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

NO SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING

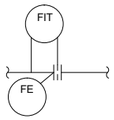
DESIGN S. KEEN | DRAWN P. CHOPADE | CHECKED D. STEFFES | APPROVED B. HERRERA | REVIEW

INSTRUMENTATION AND CONTROL
SYMBOLS AND NOMENCLATURE – I

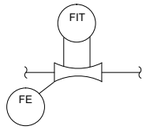
PROJECT NUMBER 483-20-02
DATE: DECEMBER 2022

DRAWING NO. I-01
SHEET 83 OF 126

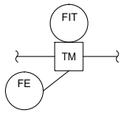
FLOW INSTRUMENTS



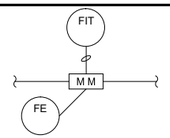
ORIFICE PLATE WITH VENA CONTRACTA, RADIUS, OR PIPE TAPS CONNECTED TO DIFFERENTIAL-PRESSURE -TYPE FLOW TRANSMITTER



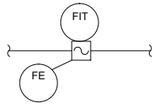
VENTURI TUBE WITH (DIFFERENTIAL PRESSURE) FLOW TRANSMITTER



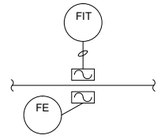
THERMAL MASS FLOW METER



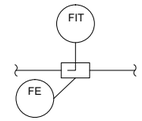
MAGNETIC FLOWMETER WITH REMOTE FLOW TRANSMITTER



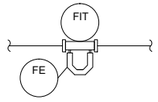
SONIC FLOWMETER DOPPLER OR TRANSIT TIME



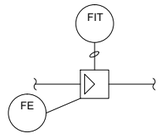
SONIC FLOWMETER CLAMP ON TYPE



SINGLE PORT PITOT TUBE OR PITOT-VENTURI TUBE



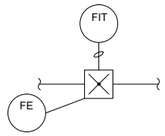
CORIOLIS FLOWMETER



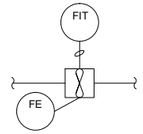
VORTEX FLOW METER



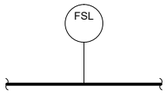
VARIABLE AREA FLOW INDICATOR (ROTAMETER)



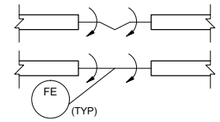
PADDLE WHEEL FLOW METER



TURBINE OR PROPELLER TYPE FLOW METER

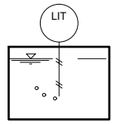


FLOW DETECTION SWITCH THERMAL TYPE

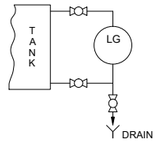


WEIR

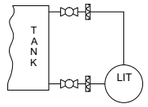
LEVEL INSTRUMENTS



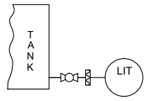
LEVEL TRANSMITTER BUBBLER TYPE



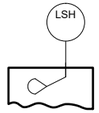
GAUGE GLASS (EXTERNALLY CONNECTED)



LEVEL TRANSMITTER, SEALED DIFFERENTIAL PRESSURE TYPE (MOUNTED ON TANK)



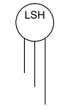
LEVEL TRANSMITTER PRESSURE ACTUATED



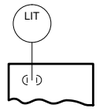
LEVEL DETECTION SWITCH FLOAT ACTUATED TYPE



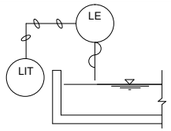
LEVEL DETECTION SWITCH VIBRATING FORK TYPE



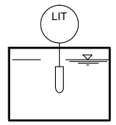
LEVEL DETECTION SWITCH CONDUCTANCE TYPE



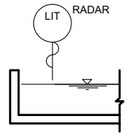
LEVEL TRANSMITTER CAPACITANCE OR DIELECTRIC OR RF ADMITTANCE TYPE



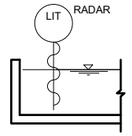
LEVEL TRANSMITTER NON-CONTACTING ULTRASONIC TYPE REMOTE MOUNTED



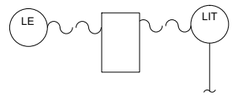
LEVEL TRANSMITTER HYDROSTATIC TYPE



LEVEL TRANSMITTER NON-CONTACTING RADAR TYPE

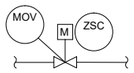


LEVEL TRANSMITTER GUIDED WAVE RADAR TYPE

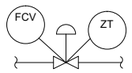


LEVEL TRANSMITTER RADIOACTIVE OR SONIC TYPE WITH INTEGRAL SENSOR

POSITION INSTRUMENTS

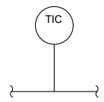


LIMIT SWITCH ON MOTORIZED VALVE INDICATING CLOSED POSITION

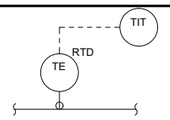


VALVE POSITION TRANSMITTER ON PNEUMATIC ACTUATED VALVE

TEMPERATURE INSTRUMENTS

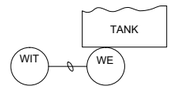


BIMETALLIC TYPE THERMOMETER, GLASS THERMOMETER, OR OTHER LOCAL UNCLASSIFIED TEMPERATURE INDICATOR

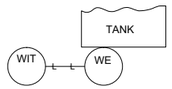


THERMOCOUPLE, RESISTANCE BULB (RTD) OR THERMISTOR (TH) TEMPERATURE TRANSMITTER WITH THERMOWELL

WEIGHT INSTRUMENTS

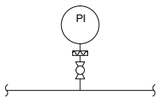


STRAIN GAUGE CONNECTED TO SEPARATE WEIGHT TRANSMITTER (TAG STRAIN GAUGE WE)

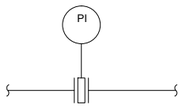


HYDRAULIC ACTUATED WEIGHT TRANSMITTER

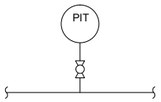
PRESSURE OR VACUUM INSTRUMENTS



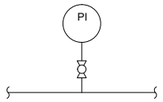
PRESSURE GAUGE WITH DIAPHRAGM SEAL



PRESSURE GAUGE WITH LIQUID FILLED ANNULAR SEAL SYSTEM

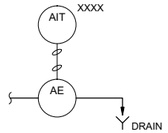


PRESSURE INDICATING TRANSMITTER



PRESSURE INDICATOR DIRECT - CONNECTED

ANALYTICAL INSTRUMENTS



FLOW THROUGH ANALYZING ELEMENT WITH REMOTE TRANSMITTER

ALK	ALKALINITY
CL_2	CHLORINE CONCENTRATION
COMB	COMBUSTIBLE GAS
COND	CONDUCTIVITY
COD	CHEMICAL OXYGEN DEMAND
DO	DISSOLVED OXYGEN
HC	HYDROCARBON
H_2O_2	HYDROGEN PEROXIDE
H_2S	HYDROGEN SULFIDE
LEL	LOWER EXPLOSIVE LIMIT
NO_3 / NO_2	NITRATE / NITRITE
NH_3 / NH_4	AMMONIA / AMMONIUM
O_2	OXYGEN CONCENTRATION
O_3	OZONE
ORP	OXIDATION - REDUCTION POTENTIAL
PC	PARTICLE COUNTER
pH	HYDROGEN ION CONCENTRATION
SCU	STREAMING CURRENT UNIT
SO	SULFUR DIOXIDE
TH 2	TOTAL HARDNESS
TKN	TOTAL KJELDAHL NITROGEN
TN	TOTAL NITROGEN
TOC	TOTAL ORGANIC CARBON
TURB	TURBIDITY
TSS	TOTAL SUSPENDED SOLIDS
UVI	ULTRA VIOLET INTENSITY
UVT	ULTRA VIOLET TRANSMITTANCE

NOTE : IN THE CASE WHERE MULTIPLE SENSORS ARE TIED TO A SINGLE TRANSMITTER OR IN THE CASE OF GAS DETECTION, THE ANALYTIC CALLOUT WILL BE ASSIGNED TO THE SENSOR.

Stantec

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No. 11965314
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12/13/22
STATE OF UTAH

NO.	DATE	REV. BY	DESCRIPTION
			REVISIONS

MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

NO SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING

REVIEW CHECKED D. STEFFES APPROVED B. HERRERA

DESIGN DESIGN S. KEEN DRAWN P. CHOPADE

INSTRUMENTATION AND CONTROL
SYMBOLS AND NOMENCLATURE - II

DATE: DECEMBER 2022
PROJECT NUMBER 483-20-02

DRAWING NO.
I-02
SHEET 84 OF 126

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VALVES

- 3 WAY MULTI-PORT VALVE
- 4 WAY MULTI-PORT VALVE
- AIR VACUUM, AIR RELEASE, OR COMBINATION AIR VACUUM AND AIR RELEASE ASSEMBLY
- ANGLE VALVE
- BACK-PRESSURE VALVE
- BACKFLOW PREVENTER VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- CONE VALVE
- DIAPHRAGM VALVE
- FLAP VALVE
- GATE VALVE
- GLOBE VALVE
- HOSE BIBB VALVE
- NEEDLE VALVE
- PINCH VALVE
- PLUG VALVE
- PRESSURE REGULATING VALVE
- PRESSURE RELIEF VALVE
- SLEEVE VALVE
- TELESCOPING VALVE
- FLOAT VALVE
- BALL CHECK VALVE
- MUD VALVE

VALVE AND GATE ACTUATORS

- DIAPHRAGM ACTUATOR
- E/H = ELECTROHYDRAULIC
  P = PNEUMATIC
  S = SOLENOID
- MOTOR ACTUATOR
- PISTON ACTUATOR
- WEIGHT BALANCED ACTUATOR

GATES

- SLIDE GATE
- STOP GATE OR SHEAR GATE

WASTEWATER EQUIPMENT

- BELT FILTER PRESS
- SHAFTLESS CONVEYOR
- SCREW CONVEYOR
- CENTRIFUGE
- GRAVITY BELT THICKENER
- BELT CONVEYOR
- SLUDGE GRINDER

HVAC

- AIR CONDITIONING UNIT
- DUCT AIR FILTER
- AIR HANDLING UNIT
- NON-MOTORIZED DAMPER
- MOTORIZED DAMPER
- DEHUMIDIFIER
- DUCT SMOKE DETECTOR
- EVAPORATIVE COOLER
- HEATER
- HVAC BOILER
- HVAC FAN
- VENT FAN
- HVAC LOUVER
- THERMOSTAT
- STEAM GENERATOR
- UNIT HEATER
- WATER HEATER
- AFTER COOLER

PUMPS & COMPRESSORS

- SLUDGE DIAPHRAGM PUMP
- HORIZONTAL CENTRIFUGAL PUMP
- GENERIC PUMP
- CHEMICAL METERING PUMP
- DRUM PUMP
- ROTARY GEAR PUMP
- SPLIT-CASE PUMP
- HOSE / PERISTALTIC PUMP
- PLUNGER / PISTON PUMP
- PROGRESSIVE CAVITY PUMP
- ROTARY LOBE PUMP
- SUBMERSIBLE SUMP PUMP
- SUBMERSIBLE TURBINE PUMP
- VERTICAL TURBINE PUMP
- VERTICAL CENTRIFUGAL PUMP
- INCLINED ARCHIMEDES SCREW PUMP
- VERTICAL SUMP PUMP
- RECIPROCATING COMPRESSOR
- ROTARY SCREW COMPRESSOR

PIPING ACCESSORIES

- ANNULAR SEAL
- ATMOSPHERIC VENT
- BLIND FLANGE
- CAP - BREATHER
- CAP - SCREW / THREADED
- CAP - WELDED
- CAP - QUICK DISCONNECT
- CHLORINE INJECTOR OR CHEMICAL EDUCTOR
- DIAPHRAGM SEAL
- DRAIN
- EXPANSION CHAMBER WITH RUPTURE DISK
- EDUCTOR
- FLANGED
- OR — FLEXIBLE CONNECTION - BELLOWS TYPE
- FLAME ARRESTOR
- FCO / FCO — FLOOR CLEANOUT
- FILTER
- HUB DRAIN
- INLINE MIXER
- PIPE MATERIAL CHANGE
- PULSATION DAMPENER
- REDUCER - CONCENTRIC
- REDUCER - ECCENTRIC
- REMOVABLE SPOOL PIECE
- UNION
- RUPTURE DISK
- STRAINER - BASKET TYPE
- STRAINER - DUPLEX BASKET TYPE
- STRAINER - WYE TYPE
- SLOPE
- TRAP
- OR WCO / WCO — WALL CLEANOUT
- TP — TIE-IN POINT

BLOWERS

- AERATOR
- BLOWER
- POSITIVE DISPLACEMENT BLOWER
- SINGLE STAGE CENTRIFUGAL BLOWER

MISCELLANEOUS

- BRIDGE CRANE
- CALIBRATION COLUMN
- CONTAINER SCALE
- CARTRIDGE FILTER
- DEMISTOR
- FIRE HYDRANT
- GAS BOTTLE
- HEAT EXCHANGER - PLATE TYPE
- HEAT EXCHANGER - STRAIGHT TYPE
- HEAT EXCHANGER - U TUBE
- HEATER
- HORN
- PANEL-MOUNTED HORN
- BEACON
- MISCELLANEOUS EQUIPMENT
- MIXER
- M — MOTOR SYMBOL
- HORIZONTAL PRESSURE VESSEL
- VERTICAL PRESSURE VESSEL
- RADIO ANTENNA
- REFRIGERATOR DRYER
- SAMPLE COOLER
- AUTO-BACKWASHING STRAINER
- TANK WITH CONE SHAPED ROOF
- TANK WITH DOME ROOF
- TANK WITH FLOATING COVER
- TANK, VESSEL, OR BIN
- TEMPERING TANK
- TOTE TANK
- WATER LEVEL
- GENERATOR

Stantec

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DESIGN
DESIGN S. KEEN
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REVIEW
CHECKED D. STEFFES
APPROVED B. HERRERA

INSTRUMENTATION AND CONTROL
SYMBOLS AND NOMENCLATURE - III

PROJECT NUMBER 483-20-02
DATE: DECEMBER 2022

DRAWING NO.
I-03
SHEET 85 OF 126

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PROCESS ABBREVIATIONS

AERATION	A
ALUMINUM SULFATE (LIQUID ALUM)	ALS
AMMONIUM HYDROXIDE (AQUEOUS AMMONIA)	AMH
AUTOMATIC SPRINKLER RISER	ASR
BLEND	B
BALLASTED FLOCCULATION POLYMER	BFP
BALLASTED FLOCCULATION SOLIDS	BFS
BLENDED PRODUCT	BP
CONDENSATE	C
CALCIUM HYDROXIDE (HYDRATED LIME)	CAH
CALCIUM OXIDE (QUICK LIME)	CAO
CHANNEL AGITATION WATER	CAW
MEMBRANE CLEANING CONCENTRATE RETURN	CCR
CHEMICAL DRAIN	CD
CONDENSER WATER RETURN	CDR
CONDENSER WATER SUPPLY	CDS
CHILLED WATER RETURN	CHR
CHILLED WATER SUPPLY	CHS
CORROSION INHIBITOR	CI
CHLORINE (GAS OR LIQUID)	CL
CHLORINE SOLUTION	CLS
CHLORINE GAS UNDER VACUUM	CLV
CENTRATE	CN
CONDENSATE DRAIN	CND
CHEMICAL CONTAINMENT	CP
MEMBRANE CLEANING PERMEATE RETURN	CPR
CIRCULATED SLUDGE	CSL
CITRIC ACID	CTA
CALCIUM THIOSULFATE	CTH
CHLORINATOR VENT AND DETECTION	CV
CHEMICAL DRAIN VENT	CVT
COAGULATED WATER	CW
COOLING WATER RETURN	CWR
COOLING WATER SUPPLY	CWS
DEFOAMING CHEMICAL	DC
DOMESTIC COLD WATER	DCW
DIESEL FUEL OIL	DFO
DEMINERALIZED WATER	DMW
DECANT	DN
DRAIN	DR
DIGESTED SLUDGE	DSL
DOMESTIC HOT WATER RETURN	DWR
DOMESTIC HOT WATER SUPPLY	DWS
ENGINE EXHAUST	EE
ENGINE COOLING WATER RETURN	EWR
ENGINE COOLING WATER SUPPLY	EWS
FOUL AIR	FA
FILTER AIR WASH	FAW
FILTER BACKWASH	FBW
FINAL EFFLUENT	FE
FERRIC CHLORIDE	FEC
FERRIC SULFATE	FES
FILTER INFLUENT	FI
FILTERED WATER	FLW
FORCE MAIN	FM
FUEL OIL RETURN	FOR
FUEL OIL SUPPLY	FOS
FIRE PROTECTION	FP
FROTH	FR
FROTH SPRAY	FS
FILTER SURFACE WASHWATER	FSW
FILTER TO WASTE	FTW
FINISHED WATER	FW
FILTER WASTE WASHWATER	FWW
GRIT	G
GRANULAR ACTIVATED CARBON	GAC
GASEOUS OXYGEN	GOX
HYDROCHLORIC ACID	HCA
HYDROGEN PEROXIDE	HDP
HYDROFLUOSILICIC ACID	HFA
HEATING WATER RETURN	HWR
HEATING WATER SUPPLY	HWS
INSTRUMENT AIR	IA
INTERMEDIATE EFFLUENT	IE
LANDFILL GAS	LFG
LUBE OIL	LO
LIQUID OXYGEN	LOX
LIQUEFIED PETROLEUM GAS	LPG
LIME SLURRY	LS
LANDSCAPING SPRINKLER SYSTEM	LSP
MEMBRANE CONCENTRATE	MC
MEMBRANE CLEANING RETURN	MCR
MEMBRANE CLEANING SUPPLY	MCS
MEMBRANE CLEANING WASTE	MCW
MECHANICAL DEWATERING POLYMER	MDP
MEMBRANE FEED	MF
METHANE GAS	MG
MIXED LIQUOR	ML
MIXED LIQUOR RECYCLE	MLR
MEMBRANE PERMEATE	MP
MURIATIC ACID	MRA
NATURAL GAS	NG
NON-LEADED GASOLINE	NLG
OVERFLOW	OF
OFFGAS	OG
OXIDATION TOWER EFFLUENT	OTE
OZONE	OZG
OZONATED WATER	OZW
PLANT AIR	PA
POWDERED ACTIVATED CARBON	PAC
POLYALUMINUM CHLORIDE	PCL
PLANT DRAIN	PDR
PRIMARY EFFLUENT	PE
PLANT INFLUENT	PI
PLANT EFFLUENT	PLE
PLANT OVERFLOW	PO
ANIONIC POLYMER	POA
CATIONIC POLYMER	POC
FILTER AID POLYMER	POF
NONIONIC POLYMER	PON
THICKENER POLYMER	POT
PRESSURIZED RECYCLE	PRR
PRESSATE	PRS
POTASSIUM PERMANGANATE	PTP
POTABLE WATER	PW
RETURN ACTIVATED SLUDGE	RAS
RECLAIMED WATER	REW
REFRIGERANT LIQUID	RFL
REFRIGERANT SUCTION	RFS
REFRIGERANT SUCTION	RSL
RETURN SECONDARY SLUDGE	RSS
RAW WATER	RW
RAINWATER LEADER	RWL
RAINWATER LEADER OVERFLOW	RWO
SCUM	S
SAMPLE	SAM
SUBNATANT	SBN
SUBNATANT OVERFLOW	SBO
SCAVENGER SYSTEM DISCHARGE	SCV
SANITARY DRAIN	SD
SODIUM BISULFITE	SDB
SODIUM HYDROXIDE (CAUSTIC SODA)	SDH
STORM DRAIN	SDR
SANITARY DRAIN VENT	SDV

PROCESS ABBREVIATIONS

SECONDARY EFFLUENT	SE
SLUDGE FILTRATE	SF
SULFURIC ACID	SFA
SLUDGE GAS	SG
SODIUM HYPOCHLORITE	SHC
SCALE INHIBITOR	SI
SLUDGE	SL
SUPERNATANT	SN
SAND SLURRY	SND
SULFUR DIOXIDE (GAS OR LIQUID)	SO
SULFUR DIOXIDE SOLUTION	SOS
SULFUR DIOXIDE GAS UNDER VACUUM	SOV
SPARE CHEMICAL	SP
SUMP PUMP DISCHARGE	SPD
SANITARY SEWER	SS
SODIUM SILICOFLUORIDE	SSF
STEAM	STM
STRUCTURE UNDERDRAIN	SU
STRUCTURE UNDERDRAIN COLLECTOR	SUC
SETTLED WATER	SW
SCRUBBER WATER RETURN	SWR
TRICKLING FILTER EFFLUENT	TFE
TRICKLING FILTER INFLUENT	TFI
TRICKLING FILTER RECYCLE	TFR
THICKENED SLUDGE	TSL
TREATED WATER	TW
UNDERDRAIN	UD
UTILITY WATER (NON-POTABLE WATER)	UW
VACUUM	V
VENT	VT
WASTE ACTIVATED SLUDGE	WAS
WASTE LUBE OIL	WLO
WASTE SECONDARY SLUDGE	WSS

EQUIPMENT ABBREVIATIONS

AIR HANDLING UNIT	AHU
AIR RELEASE VALVE	ARV
BACK FLOW PREVENTER	BFP
BACK PRESSURE SUSTAINING VALVE	BPV
BEACON	BCN
BLENDING UNIT	BLU
BLOWER	BLW
BULK STORAGE TANK	BTK
CARTRIDGE FILTER	CF
CHECK VALVE	CV
CLEAN IN PLACE	CIP
CONVEYOR	CN
DAY TANK	DTK
DEGASIFIER	DG
EXHAUST FAN	EF
FILTER (GENERAL)	F
HEATER	HTR
HIGH SERVICE PUMP	HSP
LOUVER	LOU
MECHANICAL EQUIPMENT (GENERAL)	ME
MIXER	MX
MOTOR OPERATOR VALVE	MOV
PNEUMATIC OPERATOR VALVE	POV
PRESSURE REDUCING VALVE	PRV
PRESSURE SAFETY VALVE	PSV
PUMP (GENERAL)	P
RUPTURE DISK	RD
SAMPLE PUMP	SP
SAND SEPARATOR	SS
SLIDE GATE	SG
SOLENOID OPERATOR VALVE	SOV
TANK	TK
TRANSFER PUMP	TP
VALVE (MANUAL)	V

AREA NUMBERING

- GENERAL SHEETS:
  - GENERAL SYMBOLS AND NOMENCLATURE SHEETS I-01 THRU I-04
  - NETWORK ARCHITECTURE SHEET I-08
  - FIELD NETWORK LAYOUT AND CONNECTIVITY SHEET I-07
  - CONTROL PANEL DETAILS AND ELEVATIONS SHEET I-09
  - INSTRUMENT INSTALLATION DETAILS SHEETS GI-01 THRU GI-05
  - SAMPLE WIRING DIAGRAMS SHEET I-05 AND I-06

- WWTP AREA NUMBERING:
  - AREA 20 : ALUM AND CHLORINE SYSTEM
  - AREA 70 : REUSE FILTER BUILDING

VALVE ABBREVIATIONS

GATE VALVE	VG
BALL VALVE	VB
BUTTERFLY VALVE	VF
CHECK VALVE	VC
DIAPHRAGM VALVE	VD
GLOBE VALVE	VO
NEEDLE VALVE	VN
PLUG VALVE	VP
SPECIALITY VALVES	VX

CONTROL EQUIPMENT ABBREVIATIONS

ATMOSPHERE	ATM
AUTO TRANSFER CONTROLLER	ATC
CONTACT TIME	CT
CONTROL PANEL	CP
DISTRIBUTED CONTROL SYSTEM	DCS
DIRECT ONLINE STARTER	DOL
FAIL CLOSED	FC
FIBER OPTIC CABLE	FOC
FIBER OPTIC TRANSCEIVER	FOT
FULL VOLTAGE NON-REVERSING STARTER	FVNR
FIBER OPTIC PATCH PANEL	FOPP
HUMAN MACHINE INTERFACE	HMI
LOCKED CLOSED	LC
LOCAL CONTROL PANEL	LCP
LOCAL CONTROL STATION	LCS
LOCKED OPEN	LO
LIGHTNING SURGE ARRESTOR	LSA
MOTOR CONTROL CENTER	MCC
MAIN CONTROL PANEL	MCP
MULTIMODE FIBER	MMF
MOTOR STARTER	MS
MOTOR	MTR
NOT APPLICABLE	N/A
NORMALLY CLOSED	NC
NOT IN CONTRACT	NIC
NORMALLY OPEN	NO
OPERATOR INTERFACE	OI
OPERATOR INTERFACE TERMINAL	OIT
PERSONAL COMPUTER	PC
PROGRAMMABLE LOGIC CONTROLLER	PLC
PLANT CONTROL NETWORK	PCN
POWER DISTRIBUTION UNIT	PDU
REMOTE I/O	RIO
REDUCED VOLTAGE SOLID-STATE STARTER	RVSS
REMOTE TERMINAL UNIT	RTU
SINGLE MODE FIBER	SMF
SOLID STATE METER	SSM
SHIELDED TWISTED PAIR	STP
THERMOCOUPLE	TC
UNINTERRUPTABLE POWER SUPPLY	UPS
UNSHIELDED TWISTED PAIR	UTP
VENDOR CONTROL PANEL	VCP
VARIABLE FREQUENCY DRIVE	VFD
VARIABLE SPEED DRIVE	VSD

GENERAL SHEET NOTES

1. NOT ALL ABBREVIATIONS USED

Stantec

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APPROVED B. HERRERA

INSTRUMENTATION AND CONTROL
SYMBOLS AND NOMENCLATURE – IV

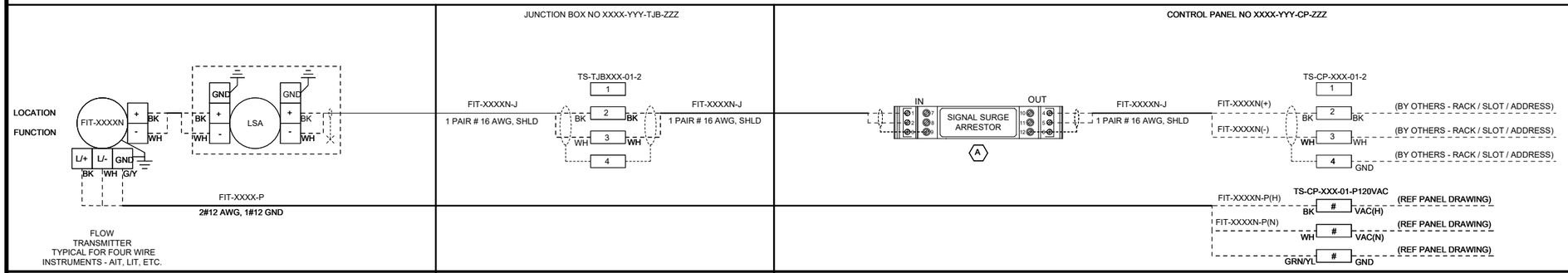
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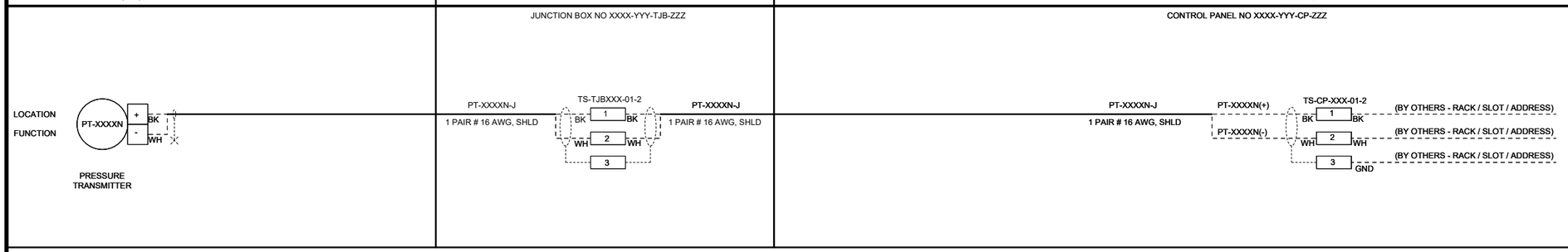
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SHEET 86 OF 126

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FIELD		CONTROL PANEL
FIELD DEVICE	FIELD JUNCTION BOX	

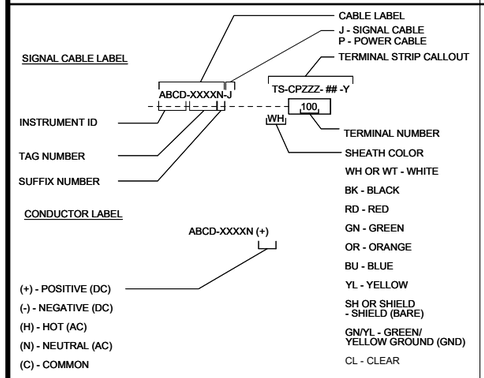
SAMPLE ANALOG INSTRUMENT WIRING DIAGRAM (HARDWIRE)



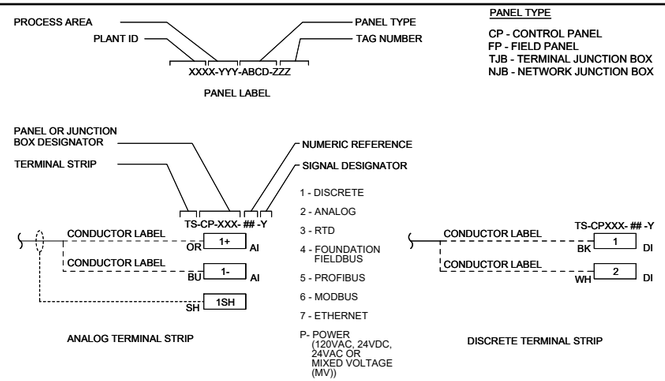


LEGENDS

SIGNAL CABLE / CONDUCTOR LABEL



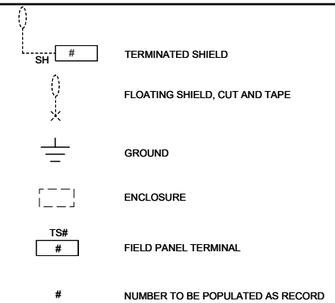
PANEL AND TERMINAL STRIP LABEL



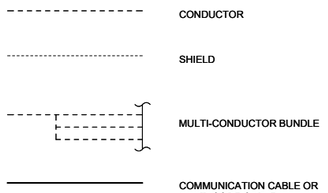
PANEL TYPE

CP - CONTROL PANEL
FP - FIELD PANEL
TJB - TERMINAL JUNCTION BOX
NJB - NETWORK JUNCTION BOX

MISCELLANEOUS SYMBOLS



WIRING DIAGRAM LINE SYMBOLOGY



GENERAL SHEET NOTES

1. WIRING INTERNAL TO THE CONTROL PANEL (BETWEEN THE FIELD TERMINALS AND THE CONTROLLER), SHALL BE FURNISHED, INSTALLED, TERMINATED, LABELED, AND TESTED BY THE CONTROL PANEL SUPPLIER. CONTROL PANEL SUPPLIER SHALL ALSO POPULATE THE RACK / SLOT / ADDRESS OF EACH POINT.
2. SHEATH CUTBACK TO BE MINIMIZED WHERE APPLICABLE.
3. CABLES SHALL HAVE APPROVED CABLE MARKERS AT BOTH ENDS, TAGGED AS SHOWN.
4. REFER TO SPECIFICATION SECTION 26_05_19 FOR CABLE AND WIRING GUIDELINES.
5. CABLE SHIELD AND OVERALL SHIELD TO BE CUT BACK AND TAPED IN THE FIELD.
6. INTERNAL JUNCTION BOX WIRES SHALL BE FERRULED AND LABELED IN ACCORDANCE WITH DIVISION 26 SPECIFICATIONS.
7. SPARE CONDUCTORS SHALL BE TERMINATED AND LABELED AS SPARE.

SHEET KEYNOTES

A. REFER TO SPECIFICATION SECTION 40_91_00 FOR LIGHTNING AND SURGE ARRESTOR SUPPLY REQUIREMENTS.

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INSTRUMENTATION AND CONTROL
SAMPLE WIRING DIAGRAM – I

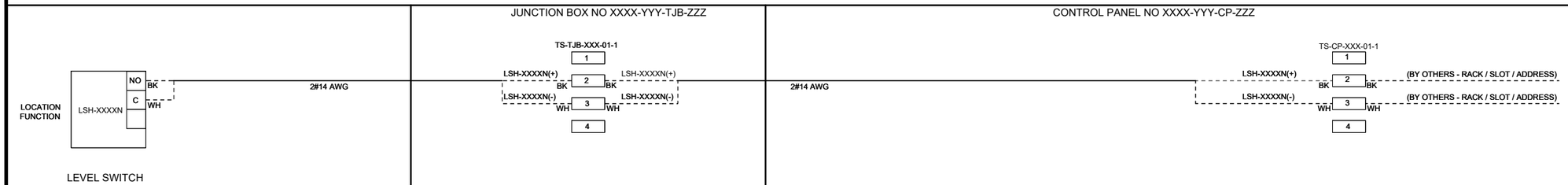
PROJECT NUMBER 483-20-02
DATE: DECEMBER 2022

DRAWING NO.
I-05
SHEET 87 OF 126

C:\PlanitCache\181301171-Magna Water Reuse Facility\P\D DWG\I-05.dwg Plotted: 12/14/2022 10:33 AM By: Chopade, Pandurang

FIELD		CONTROL PANEL
FIELD DEVICE	FIELD JUNCTION BOX	

SAMPLE DISCRETE INSTRUMENT WIRING DIAGRAM (HARDWIRE)



GENERAL SHEET NOTES

1. WIRING INTERNAL TO THE CONTROL PANEL(BETWEEN THE FIELD TERMINALS AND THE CONTROLLER), SHALL BE FURNISHED, INSTALLED,TERMINATED, LABELED, AND TESTED BY THE CONTROL PANEL SUPPLIER. CONTROL PANEL SUPPLIER SHALL ALSO POPULATE THE RACK / SLOT / ADDRESS OF EACH POINT.
2. SHEATH CUTBACK TO BE MINIMIZED WHERE APPLICABLE.
3. CABLES SHALL HAVE APPROVED CABLE MARKERS AT BOTH ENDS, TAGGED AS SHOWN.
4. REFER TO SPECIFICATION SECTION 26_05_19 FOR CABLE AND WIRING GUIDELINES.
5. INTERNAL JUNCTION BOX WIRES SHALL BE FERRULED AND LABELED IN ACCORDANCE WITH DIVISION 26 SPECIFICATIONS.
6. SPARE CONDUCTORS SHALL BE TERMINATED AND LABELED AS SPARE.

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PROFESSIONAL ENGINEER
No.11965314
BARBARA HERRERA
12/13/22
STATE OF UTAH

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MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

NO SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING

DESIGN S. KEEN
DRAWN P. CHOPADE
REVIEW CHECKED D. STEFFES
APPROVED B. HERRERA

INSTRUMENTATION AND CONTROL
SAMPLE WIRING DIAGRAM - II

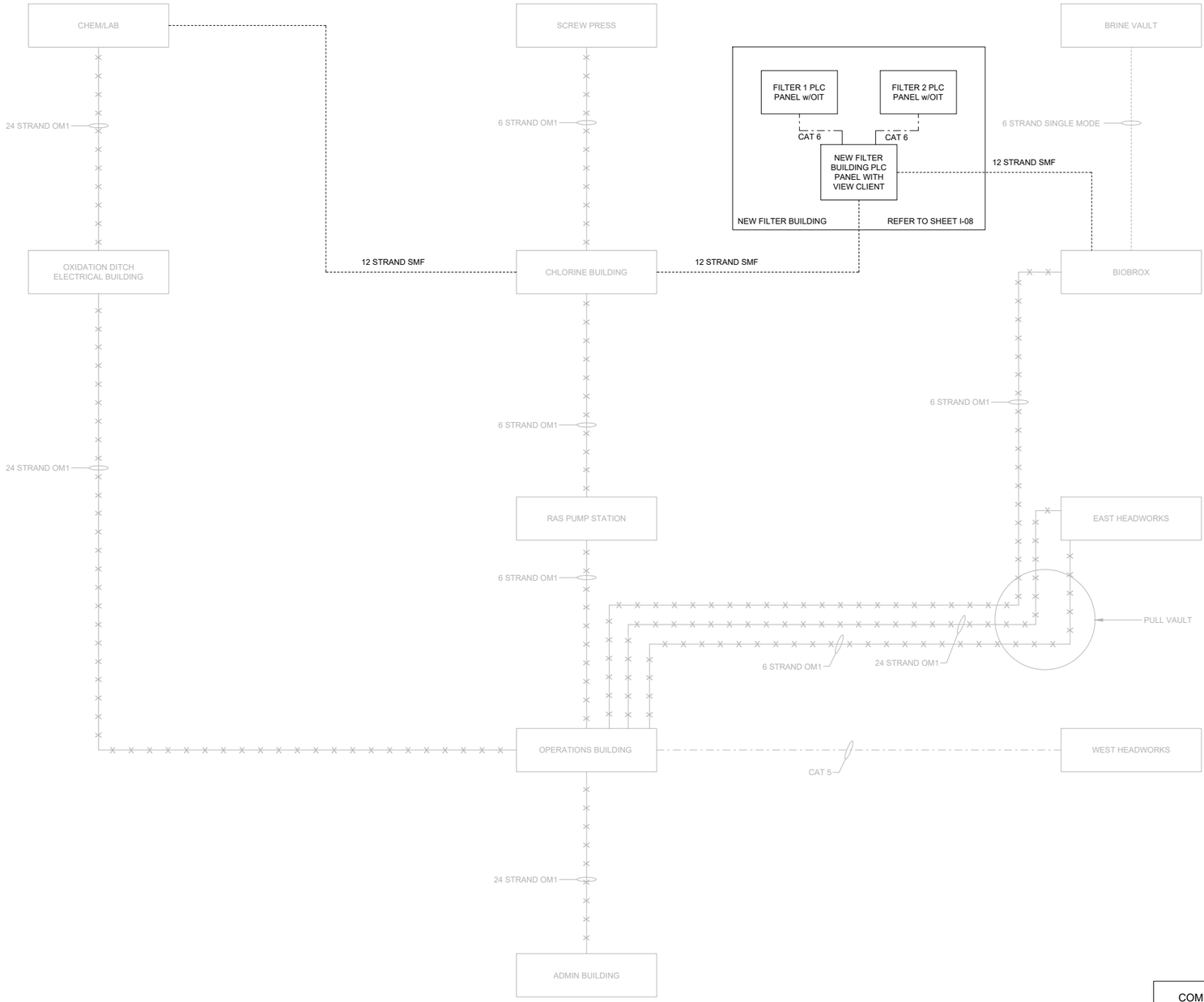
DATE: DECEMBER 2022
PROJECT NUMBER 483-20-02

DRAWING NO.
I-06

SHEET 88 OF 126

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MAGNA WWTP SCADA FIBER BLOCK DIAGRAM



GENERAL SHEET NOTES

1. CONTRACTOR SHALL PROVIDE SIGNAL MODE FIBER CONNECTIVITY IN EXISTING FACILITIES ARE NEEDED TO TERMINATE NEW FIBER TO/FROM FILTER BUILDING.
2. CONTRACTOR SHALL FIELD VERIFY CONDITION OF EXISTING FIBER ,TEST AND REPLACE AS NEEDED TO PROVIDE PLANT SCADA COMMUNICATION TO FILTER BUILDING.

COMMUNICATION LINE DEFINITIONS
(UNLESS SPECIFICALLY NOTED OTHERWISE PER DRAWING LEGEND)

- —·—·—·— UTP (CAT 5e OR CAT 6 AS NOTED)
- ---------- SINGLE MODE FIBER
- —X—X—X— MULTIMODE FIBER

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REVIEW
CHECKED D. STEFFES
APPROVED B. HERRERA

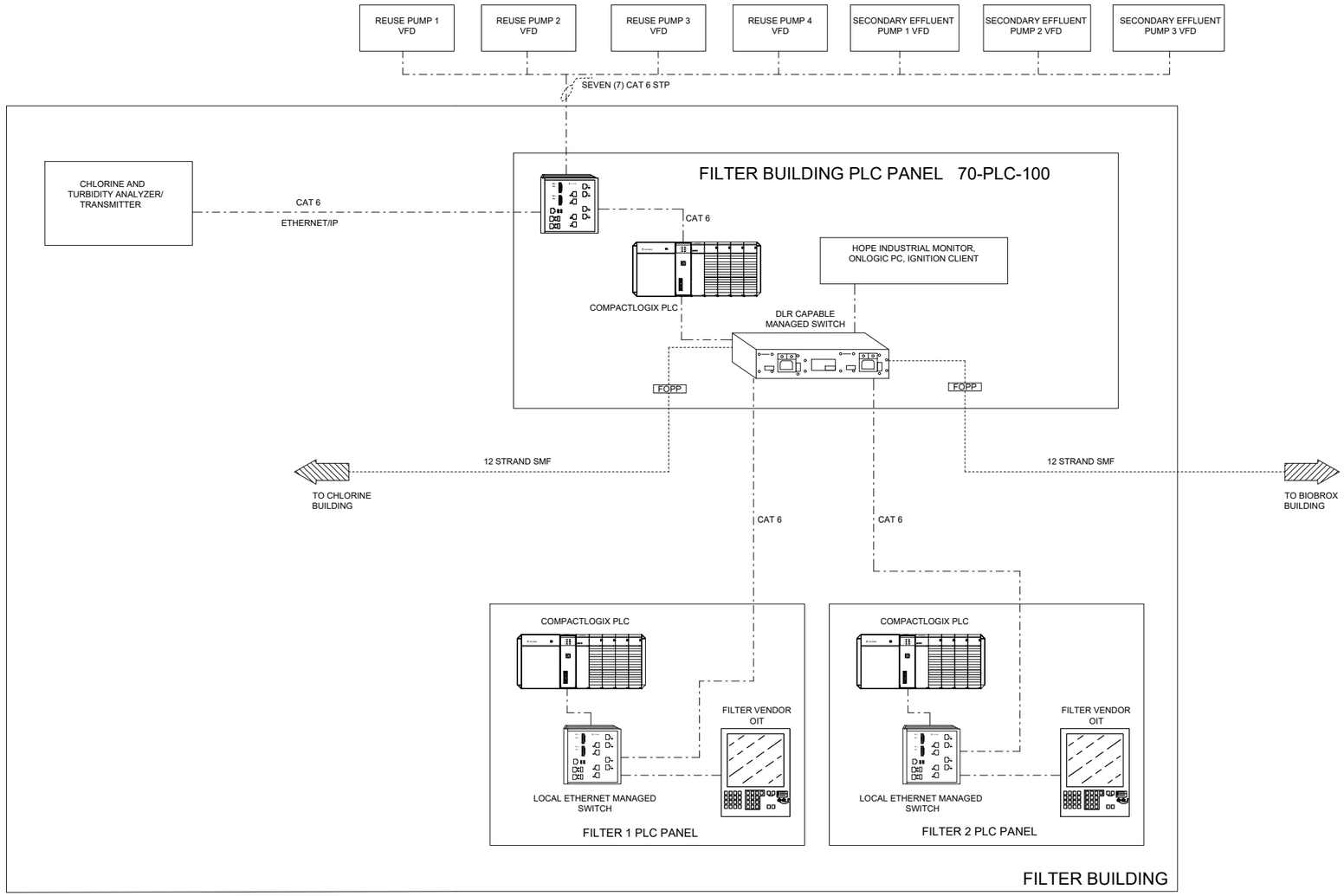
DESIGN
DESIGN S. KEEN
DRAWN P. CHOPADE

INSTRUMENTATION AND CONTROL
NETWORK ARCHITECTURE – I

DATE: DECEMBER 2022
PROJECT NUMBER 483-20-02

DRAWING NO.
I-07
SHEET 89 OF 126

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GENERAL SHEET NOTES

1. PLCS IN FILTER BUILDING ALL COMPACTLOGIX.
2. CONTRACTOR SHALL ADD SINGLE-MODE FIBER FROM CHEMICAL BUILDING TO CHLORINE BUILDING, CHLORINE BUILDING TO FILTER BUILDING, AND FILTER BUILDING TO BIOBROX.
3. SYSTEM INTEGRATOR TO INTEGRATE FINAL DETAILED NETWORK DESIGN INTO EXISTING PLANT NETWORK IN COORDINATION WITH PLANT NETWORK ADMINISTRATOR. AND FILTER CONTROL PANEL SUPPLIER ,INCLUDING IP. ADDRESS ASSIGNMENTS.
4. OWNER'S SYSTEM INTEGRATOR SHALL ADD AND/OR MODIFY EXISTING NETWORK EQUIPMENT AS NEEDED TO CREATE A RING NETWORK IN COORDINATION WITH OWNER.

COMMUNICATION LINE DEFINITIONS
(UNLESS SPECIFICALLY NOTED OTHERWISE PER DRAWING LEGEND)

- —·—·—·— UTP (CAT 5e OR CAT 6 AS NOTED)
- ---------- SINGLE MODE FIBER
- —x—x—x— MULTIMODE FIBER

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PROFESSIONAL ENGINEER No.11965314 BARBARA HERRERA 12/13/22 STATE OF UTAH

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MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

REVIEW CHECKED D. STEFFES APPROVED B. HERRERA

DESIGN DESIGN S. KEEN DRAWN P. CHOPADE

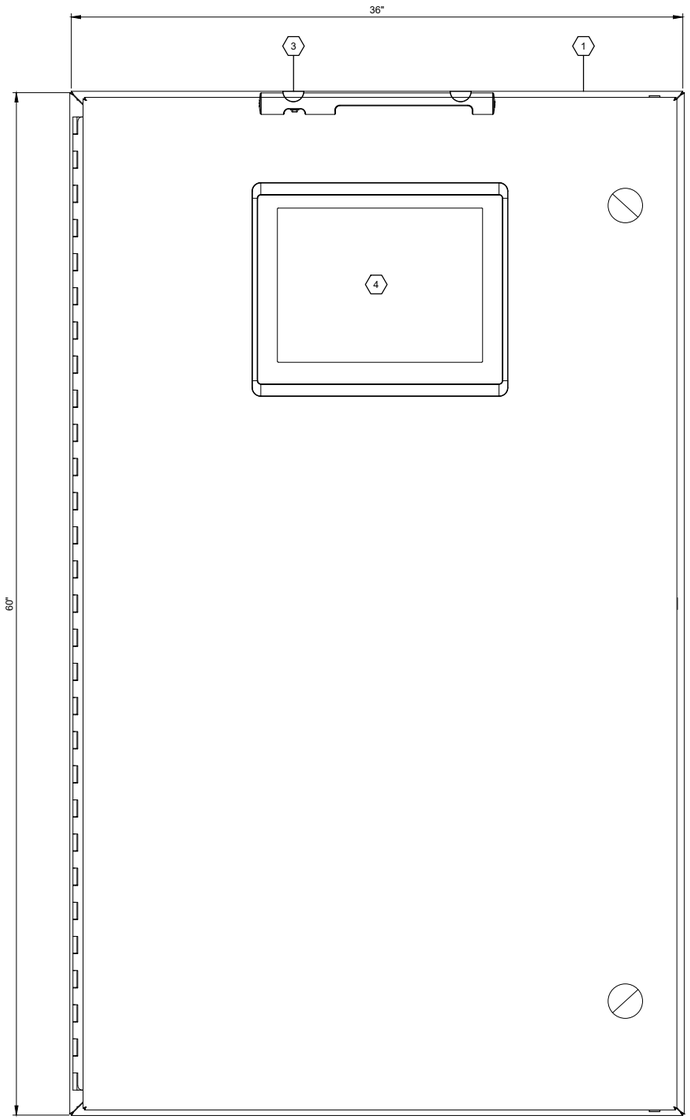
INSTRUMENTATION AND CONTROL
NETWORK ARCHITECTURE – II

DATE: DECEMBER 2022
PROJECT NUMBER 483-20-02

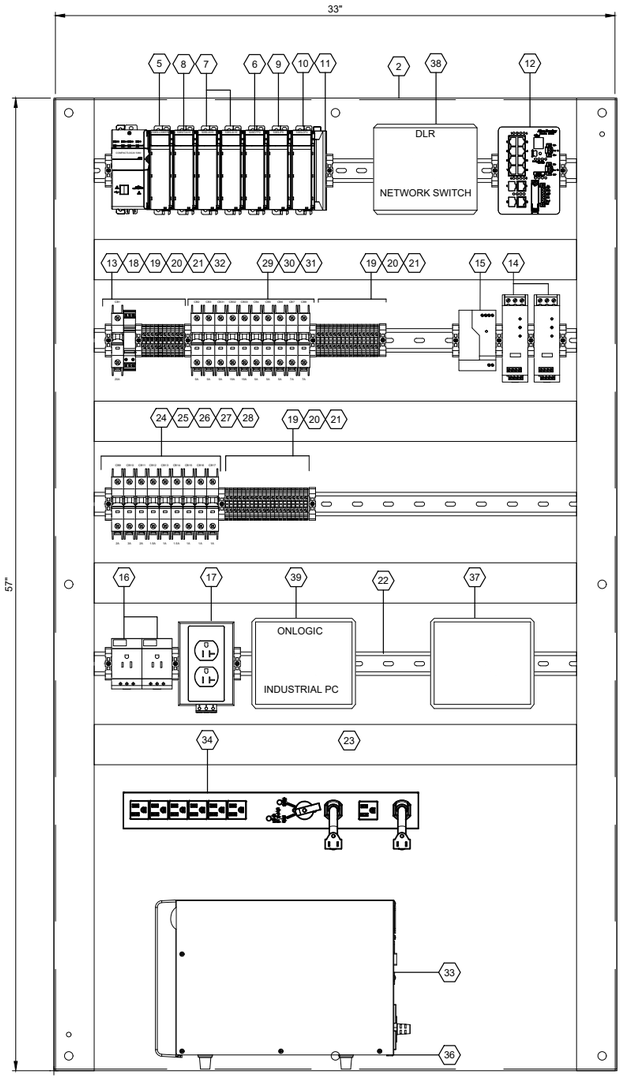
DRAWING NO. I-08

SHEET 90 OF 126

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FRONT ELEVATION
SCALE : NTS



GENERAL ARRANGEMENT
SCALE : NTS

BILL OF MATERIALS

ITEM #	QTY	MANUFACTURER	PART NUMBER	PART DESCRIPTION
1	1	HOFFMAN	CSD603612 OR EQUAL	SINGLE DOOR ENCLOSURE, WALL MOUNT, NEMA TYPE 12 STEEL, CONTINUOUS HINGE, 60"H X 36"W X 12"D
2	1	HOFFMAN	A60P36	BACK PANEL, STEEL, 57" X 33"
3	1	HOFFMAN	LEDA1S35	ENCLOSURE, ACCESSORY, LIGHT, LED, 120VAC
4	1	HOPE INDUSTRIAL	HIS-ML15-STTH	HOPE INDUSTRIAL MONITOR, 15" TOUCH SCREEN ,24 VDC
5	1	ALLEN-BRADLEY	5069-L306ER	COMPACTLOGIX PROCESSOR
6	1	ALLEN-BRADLEY	5069-FPD	FIELD POTENTIAL DISTRIBUTER
7	2	ALLEN-BRADLEY	5069-IB16	16 POINT INPUT CARD, 24VDC
8	1	ALLEN-BRADLEY	5069-OW16	16 POINT OUTPUT CARD
9	1	ALLEN-BRADLEY	5069-IF8	ANALOG INPUT CARD
10	1	ALLEN-BRADLEY	5069-OF4	ANALOG OUTPUT CARD
11	1	ALLEN-BRADLEY	5069-ECR	PLC END CAP
12	1	ALLEN-BRADLEY	1783-BMS10CGN	10 PORT STRATIX MANAGED ETHERNET SWITCH
13	1	PHOENIX CONTACT	2856812	SURGE SUPPRESSOR
14	2	PHOENIX CONTACT	VENDOR ASSIGN	24 VOLT DC POWER SUPPLY
15	1	PHOENIX CONTACT	VENDOR ASSIGN	24 VDC REDUNDANCY MODULE
16	2	PHOENIX CONTACT	VENDOR ASSIGN	SIMPLEX PLUG SOCKET, 120V
17	1	PHOENIX CONTACT	5600525	DUPLEX RECEPTACLE 20A
18	5	PHOENIX CONTACT	3044115	TERMINAL BLOCK - BLUE
19	40	PHOENIX CONTACT	3044102	TERMINAL BLOCK - GRAY
20	3	PHOENIX CONTACT	3047028	END COVER
21	19	PHOENIX CONTACT	0800886	END HOLDER
22	A/R	PHOENIX CONTACT	1201730	DIN RAIL
23	A/R	PHOENIX CONTACT	3240263	WIRE DUCT WITH COVER 2" X 4"
24	1	EATON	FAZ-C0.5/1-NA-L	CIRCUIT BREAKER, 1 POLE, 0.5 AMP, C CURVE
25	4	EATON	FAZ-C1/1-NA-L	CIRCUIT BREAKER, 1 POLE, 1 AMP, C CURVE
26	1	EATON	FAZ-C1.5/1-NA-L	CIRCUIT BREAKER, 1 POLE, 1.5 AMP, C CURVE
27	2	EATON	FAZ-C2/1-NA-L	CIRCUIT BREAKER, 1 POLE, 2 AMP, C CURVE
28	1	EATON	FAZ-C3/1-NA-L	CIRCUIT BREAKER, 1 POLE, 3 AMP, C CURVE
29	6	EATON	FAZ-C5/1-NA-L	CIRCUIT BREAKER, 1 POLE, 5 AMP, C CURVE
30	2	EATON	FAZ-C7/1-NA-L	CIRCUIT BREAKER, 1 POLE, 7 AMP, C CURVE
31	2	EATON	FAZ-C15/1-NA-L	CIRCUIT BREAKER, 1 POLE, 15 AMP, C CURVE
32	1	EATON	FAZ-C20/1-NA-L	CIRCUIT BREAKER, 1 POLE, 20 AMP, C CURVE
33	1	EATON	9SX700	TOWER STYLE UPS 700VA, 120V
34	1	EATON	EHBPL1500R-PDUIU	HOT SWAP MAINTENANCE BYPASS
35	-	-	-	-
36	1	HOFFMAN	E19SWM12U24	BACKPLATE MOUNTED SHELF
37	1	CORNING	SPH-01P	FIBER PATCH PANEL
38	1	UNIFI	VENDOR ASSIGN	8 PORT MANAGED SWITCH,DLR CAPABLE, MINIMUM
39	1	ONLOGIC	VENDOR ASSIGN	PANEL MOUNT INDUSTRIAL PC, IGNITION CLIENT

GENERAL SHEET NOTES

1. CONTROL PANEL LAYOUT IS DIAGRAMMATIC. PANEL SUPPLIER SHALL SIZE THE ENCLOSURE AND BACK PANEL TO CONTAIN THE EQUIPMENT REQUIRED TO MAKE THE INSTALLATION COMPLETE AND SUITABLE FOR ITS INTENDED PURPOSE. THE CONTROL PANEL SUBMITTAL SHALL REFLECT AN ACCURATE LAYOUT AND BILL OF MATERIALS FOR THE EQUIPMENT IN THE PANEL.

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PROFESSIONAL ENGINEER
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BARBARA HERRERA
12/13/22
STATE OF UTAH

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NO SCALE
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MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

REVIEW
CHECKED D. STEFFES
APPROVED B. HERRERA

DESIGN
DESIGN S. KEEN
DRAWN P. CHOPADE

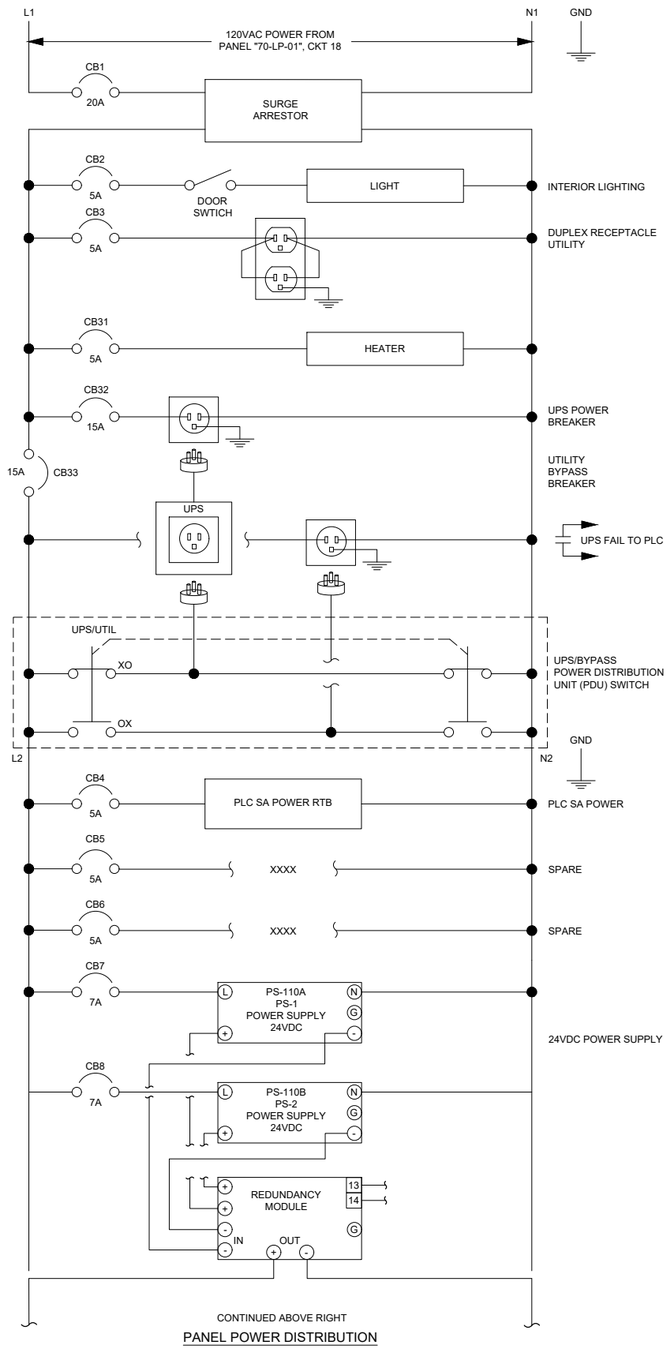
INSTRUMENTATION AND CONTROL
CONTROL PANEL ELEVATIONS

DATE: DECEMBER 2022
PROJECT NUMBER 483-20-02

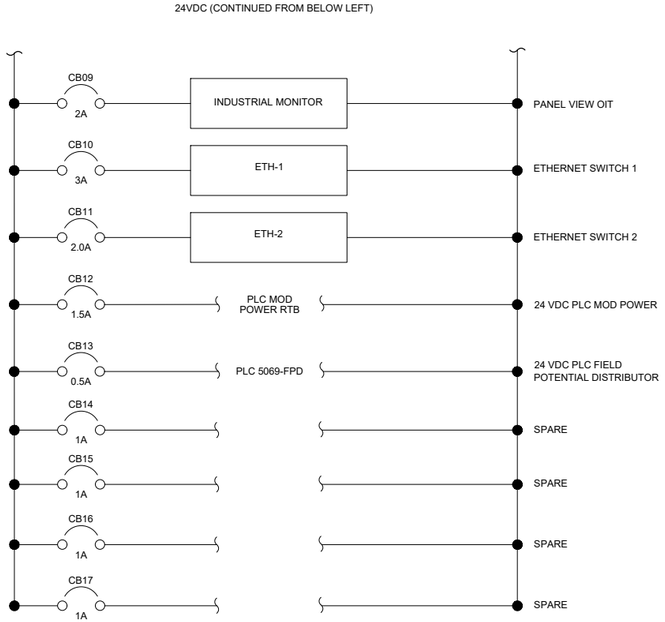
DRAWING NO.
I-09

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PANEL POWER DISTRIBUTION



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MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

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DESIGN S. KEEN
DRAWN P. CHOPADE
REVIEW CHECKED D. STEFFES
APPROVED B. HERRERA

INSTRUMENTATION AND CONTROL
PLC PANEL POWER DISTRIBUTION

DATE: DECEMBER 2022
PROJECT NUMBER 483-20-02

DRAWING NO.
I-10
SHEET 92 OF 126

HMI

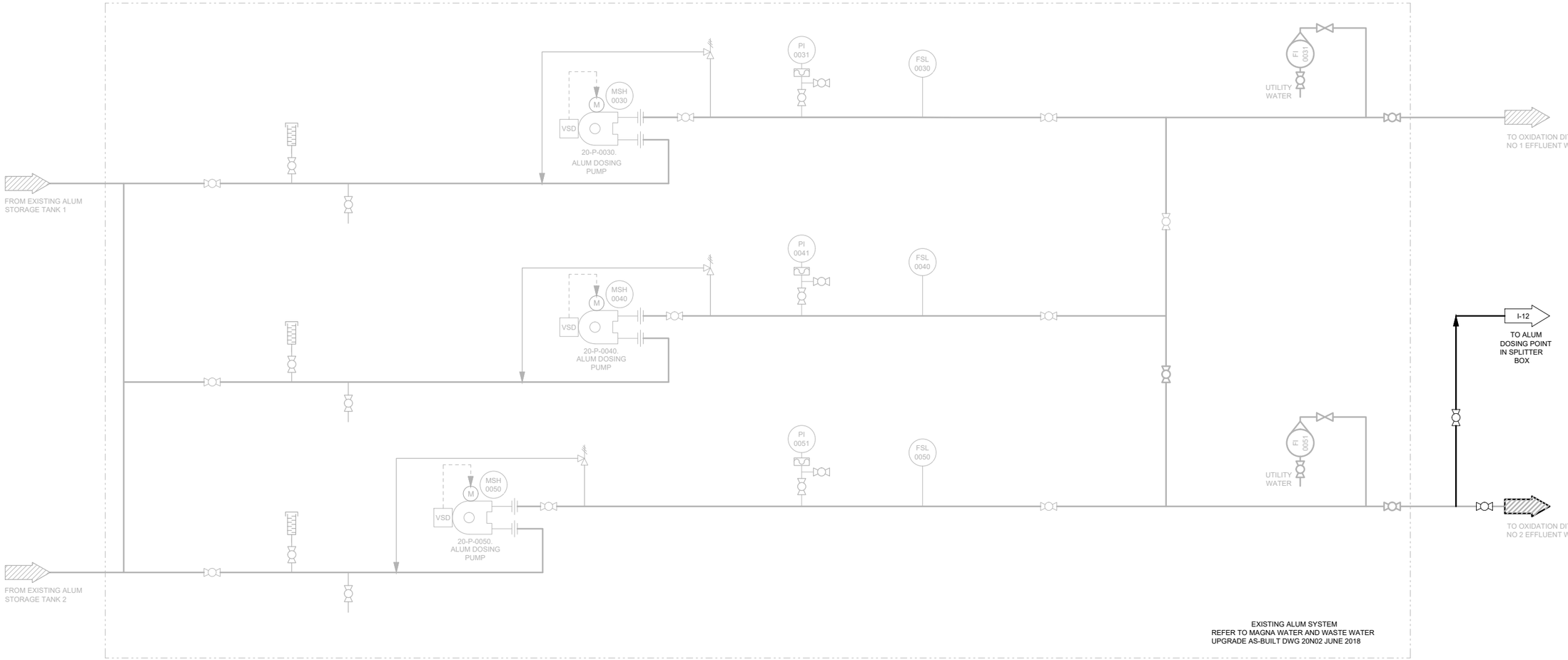
HMI

XX-PLC-XXXX

XX-PLC-XXXX

FIELD

FIELD



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MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

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DESIGN DESIGN S. KEEN DRAWN P. CHOPADE

INSTRUMENTATION AND CONTROL
ALUM FEED SYSTEM

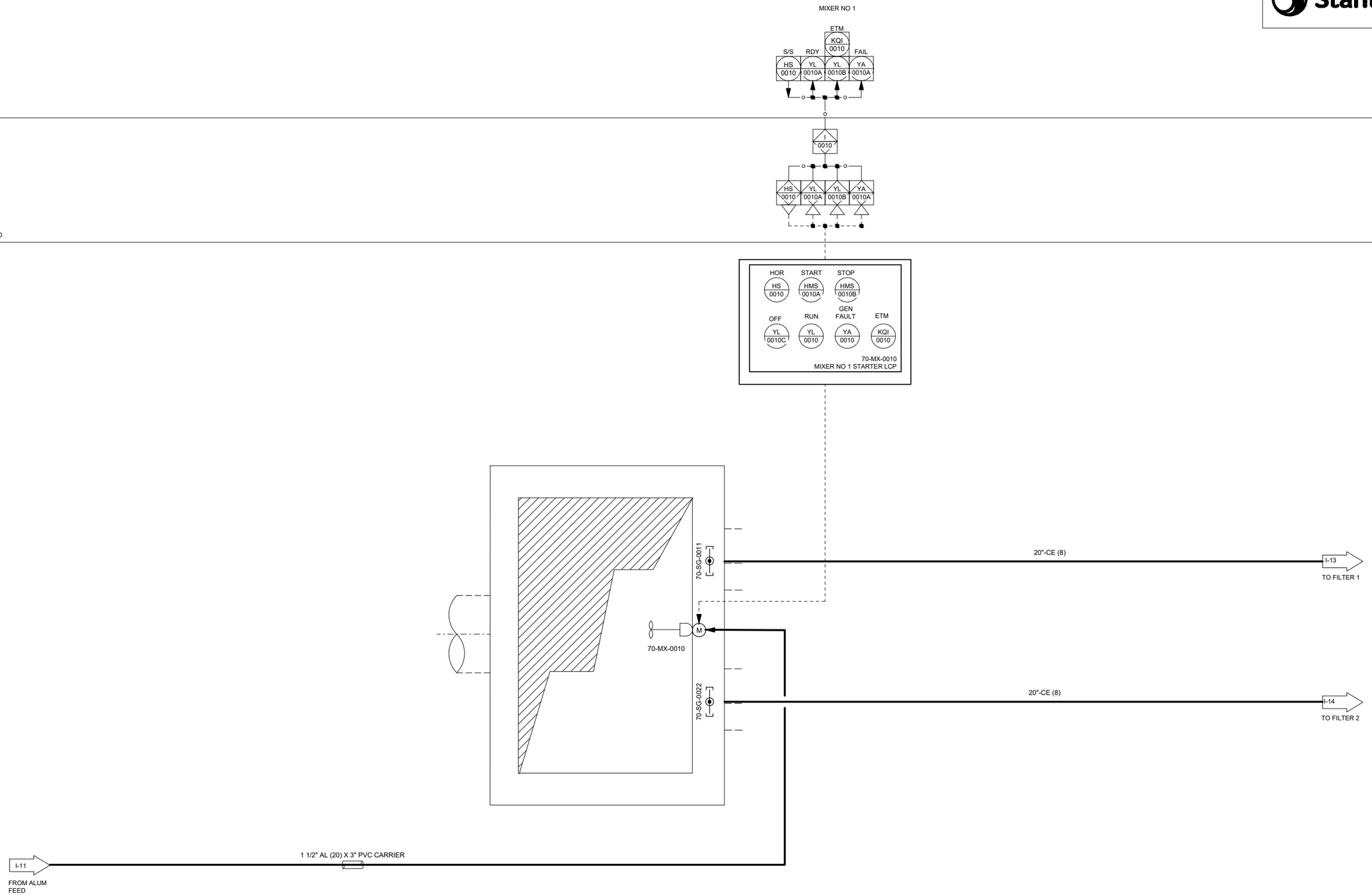
PROJECT NUMBER 483-20-02

DATE: DECEMBER 2022

DRAWING NO.
I-11

SHEET 93 OF 126

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MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

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DRAWN P. CHOPADE
REVIEW
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APPROVED B. HERRERA

INSTRUMENTATION AND CONTROL
SPLITTER BOX

DATE: DECEMBER 2022
PROJECT NUMBER 483-20-02

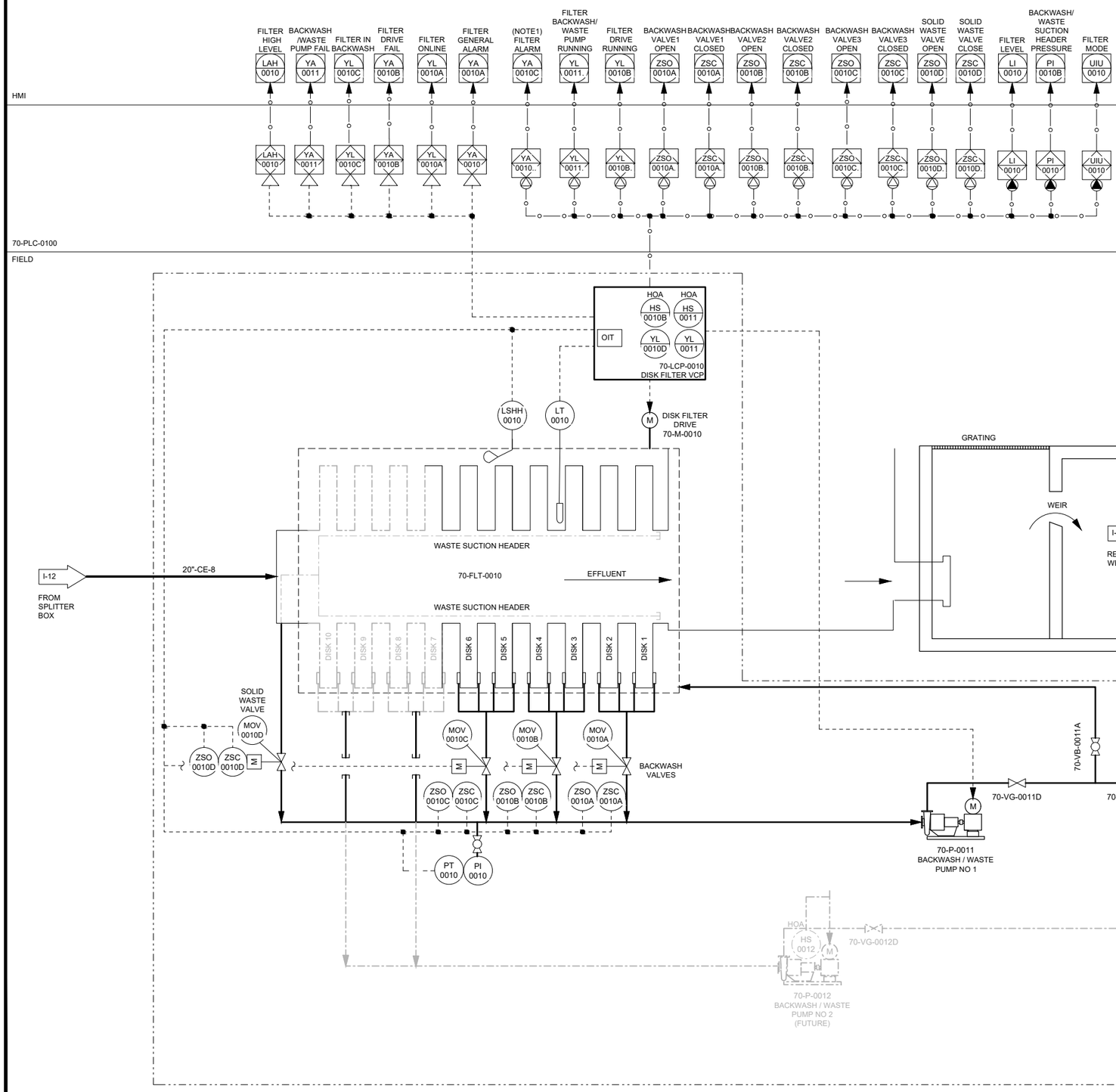
DRAWING NO.
I-12
SHEET 94 OF 126

C:\PlantCache\181301171-Magna Water Reuse Facility\PID DWG\I-12.dwg Plotted: 12/14/2022 10:34 AM By: Chopade, Pandurang

GENERAL SHEET NOTES

1. COORDINATE WITH FILTER VENDOR FOR ALARM LIST. APPROXIMATELY 25 ALARMS.

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REVIEW CHECKED D. STEFFES
APPROVED B. HERRERA

INSTRUMENTATION AND CONTROL
FILTER BAY – 1

PROJECT NUMBER 483-20-02
DATE: DECEMBER 2022

DRAWING NO. I-13
SHEET 95 OF 126

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GENERAL SHEET NOTES

1. COORDINATE WITH FILTER VENDOR FOR ALARM LIST APPROXIMATELY 25 ALARMS.

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HMI

FILTER HIGH LEVEL LAH 0020
BACKWASH /WASTE PUMP FAIL YA 0021
FILTER IN BACKWASH YL 0020C
FILTER DRIVE FAIL YA 0020B
FILTER ONLINE YL 0020A
FILTER GENERAL ALARM YA 0020A
(NOTE1) FILTER ALARM YA 0020C
FILTER BACKWASH/ WASTE PUMP RUNNING YL 0021
FILTER DRIVE RUNNING YL 0020B
BACKWASH VALVE1 OPEN ZSO 0020A
BACKWASH VALVE1 CLOSED ZSC 0020A
BACKWASH VALVE2 OPEN ZSO 0020B
BACKWASH VALVE2 CLOSED ZSC 0020B
BACKWASH VALVE3 OPEN ZSO 0020C
BACKWASH VALVE3 CLOSED ZSC 0020C
SOLID WASTE VALVE OPEN ZSO 0020D
SOLID WASTE VALVE CLOSE ZSC 0020D
FILTER LEVEL LI 0020
BACKWASH/ WASTE SUCTION HEADER PRESSURE PI 0020B
FILTER MODE UIU 0020

SUMP HIGH HIGH LEVEL LAHH 0051
SUMP HIGH LEVEL LAH 0051
SUMP PUMP 1 RUNNING YL 0051
SUMP PUMP 1 FAIL YA 0051A
SUMP PUMP 2 RUNNING YL 0052
SUMP PUMP 2 FAIL YA 0052A
BASEMENT FLOOD LAHH 0070

HMI

70-PLC-0100

FIELD

70-PLC-0100

FIELD

HOA HS 0020B
HOA HS 0021
OIT
YL 0020B
YL 0021
70-LCP-0020
DISK FILTER VCP

LSHH 0020
LT 0020
M
DISK FILTER DRIVE 70-M-0020

WASTE SUCTION HEADER
70-FLT-0020
EFFLUENT
WASTE SUCTION HEADER

I-12
FROM SPLITTER BOX
20"-CE (8)

DISK 10
DISK 9
DISK 8
DISK 7
DISK 6
DISK 5
DISK 4
DISK 3
DISK 2
DISK 1

SOLID WASTE VALVE
MOV 0020D
ZSO 0020D
ZSC 0020D
M

MOV 0020C
MOV 0020B
MOV 0020A
BACKWASH VALVE

ZSO 0020 C
ZSC 0020 C
ZSO 0020B
ZSC 0020B
ZSO 0020 A
ZSC 0020 A

PT 0020
PI 0020

GRATING
WEIR
I-15
REUSE WET WELL

70-VB-0011A
70-VG-0021D
70-VC-0011
70-VB-0011B
TO PLANT DRAIN

M
70-P-0021
BACKWASH / WASTE PUMP NO 1

HOA
HS 0022
M
70-VG-0022D
70-VG-0022G
70-VG-0022C
70-P-0022
BACKWASH / WASTE PUMP NO 2 (FUTURE)

VENDOR DISK FILTER PACKAGE

HOA HS 0051
HOA HS 0052
HIGH LEVEL LAH 0051
RUNNING YL 0051
RUNNING YL 0052
HIGH HIGH LEVEL LAHH 0051
FAIL YA 0051
FAIL YA 0052
70-LCP-0200
FILTER SUMP PUMP LCP

70-VB-0053
70-VB-0054
LSHH 0051
LSH 0051
LSL 0051
LSHH 0070
M
70-P-0051
70-VC-0051
M
70-P-0052
70-VC-0052
FILTER DRYWELL SUMP

BOWEN COLLINS & ASSOCIATES

PROFESSIONAL ENGINEER
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MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

NO SCALE
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REVIEW
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APPROVED B. HERRERA

DESIGN
DESIGN S. KEEN
DRAWN P. CHOPADE

INSTRUMENTATION AND CONTROL
FILTER BAY – 2

PROJECT NUMBER 483-20-02
DATE: DECEMBER 2022

DRAWING NO.
I–14
SHEET 96 OF 126

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SECONDARY REUSE PUMP NO 1 — ETM KQI 0031 — S/S RDY SPD CTRL SPD IND FAIL — HS 0031 | YL 0031A | SK 0031 | SI 0031 | YL 0031B | YA 0031A | II 0031 | PAH 0031 | TAH 0031

SECONDARY REUSE PUMP NO 2 — ETM KQI 0032 — S/S RDY SPD CTRL SPD IND FAIL — HS 0032 | YL 0032A | SK 0032 | SI 0032 | YL 0032B | YA 0032A | II 0032 | PAH 0032 | TAH 0032

SECONDARY REUSE PUMP NO 3 — ETM KQI 0033 — S/S RDY SPD CTRL SPD IND FAIL — HS 0033 | YL 0033A | SK 0033 | SI 0033 | YL 0033B | YA 0033A | II 0033 | PAH 0033 | TAH 0033

SECONDARY REUSE PUMP NO 4 — ETM KQI 0034 — S/S RDY SPD CTRL SPD IND FAIL — HS 0034 | YL 0034A | SK 0034 | SI 0034 | YL 0034B | YA 0034A | II 0034 | PAH 0034 | TAH 0034

LEVEL — LAH 0030 | LAL 0030 | LI 0030 | LALL 0030

RESERVOIR HIGH HIGH LEVEL — LAHH 0050

PRESSURE — PAHH 0030 | PAH 0030 | PI 0030

FLOW — FQI 0030 | FI 0030 | FAL 0030 | FALL 0030

HMI

I 0031 — I 0032 — I 0033 — I 0034

GI-04 — TURBIDITY AAHH, CHLORINE AALL, OR AAHH STOP PUMPS

NOTE 1 — FROM RESERVOIR HIGH HIGH LEVEL

LIT 0030 — LSLL 0030 — LAHH 0050 — FC 0033 — PIT 0030 — FIT 0030

70-PLC-0100

FIELD

HOR HS 0031B — START HMS 0031A — STOP HMS 0031B — DRIVE TRIP CIRCUIT I 0031 — SPD CTRL SC 0031 — VFD RESET HMS 0031C — RUN YL 0031B — AMPS II 0031 — SPD SI 0031 — PAH 0031 — VFD AVAIL YL 0031A — GEN FAULT YA 0031B — TAH 0031 — OI — VFD CP

70-VFD-0031
SECONDARY REUSE PUMP NO 1 VFD

HOR HS 0032 — START HMS 0032A — STOP HMS 0032B — DRIVE TRIP CIRCUIT I 0032 — SPD CTRL SC 0032 — VFD RESET HMS 0032C — RUN YL 0032B — AMPS II 0032 — SPD SI 0032 — PAH 0032 — VFD AVAIL YL 0032A — GEN FAULT YA 0032B — TAH 0032 — OI — VFD CP

70-VFD-0032
SECONDARY REUSE PUMP NO 2 VFD

HOR HS 0033 — START HMS 0033A — STOP HMS 0033B — DRIVE TRIP CIRCUIT I 0033 — SPD CTRL SC 0033 — VFD RESET HMS 0023C — RUN YL 0033B — AMPS II 0033 — SPD SI 0033 — PAH 0033 — VFD AVAIL YL 0033A — GEN FAULT YA 0033B — TAH 0033 — OI — VFD CP

70-VFD-0033
SECONDARY REUSE PUMP NO 3 VFD

HOR HS 0034 — START HMS 0034A — STOP HMS 0034B — DRIVE TRIP CIRCUIT I 0034 — SPD CTRL SC 0034 — VFD RESET HMS 0034C — RUN YL 0034B — AMPS II 0034 — SPD SI 0034 — PAH 0034 — VFD AVAIL YL 0034A — GEN FAULT YA 0034B — TAH 0034 — OI — VFD CP

70-VFD-0034
SECONDARY REUSE PUMP NO 4 VFD

FILTER BUILDING ELECTRICAL ROOM

POWER — JL 0030 — LEVEL ALARM — LALL 0030 — LALL 0030

70-RCP-0030
LOW LEVEL RELAY PANEL

I-16 — TO EFFLUENT PUMP LALL INTERLOCKS

PI 0035

70-TK-0030 — SURGE TANK — 70-VF-0030

120VAC — FIT 0030

PIT 0030 — PI 0030

16"-SR (8) — 16"x12" — 12"-SR (8) — M M — 16"-SR (8) — 12"x16" — TO SECONDARY RESERVOIR

SECONDARY REUSE METER VAULT

2"-CLS (20) — 2"-CLS (20) X 3" PVC CARRIER — I-18 — FROM CHLORINE BOOSTER PUMP

1 1/2"-SR (24) — GI-4 — SAMPLE TO ANALYZER WET PANEL

TSH 0031 — M — ARV 0031 — PSH 0031 — PI 0031 — 12"x16" — 12"-SR (8) — 70-VC-0031A — 70-VF-0031B

70-P-0031.
SECONDARY REUSE PUMP NO 1

TSH 0032 — M — ARV 0032 — PSH 0032 — PI 0032 — 12"x16" — 12"-SR (8) — 70-VC-0032A — 70-VF-0032B

70-P-0032.
SECONDARY REUSE PUMP NO 2

TSH 0033 — M — ARV 0033 — PSH 0033 — PI 0033 — 12"x16" — 12"-SR (8) — 70-VC-0033A — 70-VF-0033B

70-P-0033.
SECONDARY REUSE PUMP NO 3

TSH 0034 — M — ARV 0034 — PSH 0034 — PI 0034 — 8"x16" — 8"-SR (8) — 70-VC-0034A — 70-VF-0034B

70-P-0034.
SECONDARY REUSE PUMP NO 4

JOCKEY PUMP

120VAC — LI 0030 — RADAR — LT 0030 — LSLL 0030

EFFLUENT AUTO SAMPLER AE-0033

I-13 — FROM FILTER 1 EFFLUENT

I-14 — FROM FILTER 2 EFFLUENT

WEIR

CONTINUED TO DWG I-16

WET WELL

GENERAL SHEET NOTES

1. CONTRACTOR SHALL COORDINATE INTEGRATION OF THE RESERVOIR HIGH HIGH LEVEL WIRELESS I/O SIGNAL FROM RESERVOIR PRESSURE INSTRUMENT.

BOWEN COLLINS & ASSOCIATES

PROFESSIONAL ENGINEER — No.11965314 — BARBARA HERRERA — 12/15/22 — STATE OF UTAH

NO.	DATE	REV. BY	DESCRIPTION
			REVISIONS

MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

NO SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING

REVIEW — CHECKED D. STEFFES — APPROVED B. HERRERA

DESIGN — DESIGN S. KEEN — DRAWN P. CHOPADE

INSTRUMENTATION AND CONTROL
REUSE BUILDING NO – 1

DATE: DECEMBER 2022

PROJECT NUMBER 483-20-02

DRAWING NO. I-15

SHEET 97 OF 126

C:\PlantCache\181301171-Magna Water Reuse Facility\PID DWG\I-15.dwg Plotted: 12/14/2022 10:34 AM By: Chopade, Pandurang

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BOWEN COLLINS & ASSOCIATES

EFFLUENT RETURN PUMP NO 1

EFFLUENT RETURN PUMP NO 2

EFFLUENT RETURN PUMP NO 3

EMERGENCY EYEWASH SHOWER

HMI

FIELD

70-PLC-0100

I-15
FROM CHLORINE AALL OR AAHH

I-15
FROM WET WELL LALL INTERLOCKS

FROM PLANT WATER

EMERGENCY EYEWASH SHOWER

PRESSURE

FLOW

120VAC

EFFLUENT RETURN METER VAULT

16-EFR (8)

12"-EFR (8)

16"-EFR (8)

12"x16"

16x12"

10"x16"

10"-EFR (8)

70-VC-0041A

70-VF-0041B

70-VC-0034A

70-VF-0042B

70-VC-0043A

70-VF-0043B

70-P-0041, EFFLUENT RETURN PUMP NO 1

70-P-0042, EFFLUENT RETURN PUMP NO 2

70-P-0043, EFFLUENT RETURN PUMP NO 3

EFFLUENT TO C-7 DITCH

ELECTRICAL ROOM

VFD CP

70-VFD-0041
EFFLUENT RETURN PUMP NO 1 VFD

70-VFD-0042
EFFLUENT RETURN PUMP NO 2 VFD

70-VFD-0043
EFFLUENT RETURN PUMP NO 3 VFD

CONTINUED FROM DRAWING I-15

WET WELL

PROFESSIONAL ENGINEER
No. 11965314
BARBARA HERRERA
12/13/22
STATE OF UTAH

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MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

REVIEW
CHECKED D. STEFFES
APPROVED B. HERRERA

DESIGN
DESIGN S. KEEN
DRAWN P. CHOPADE

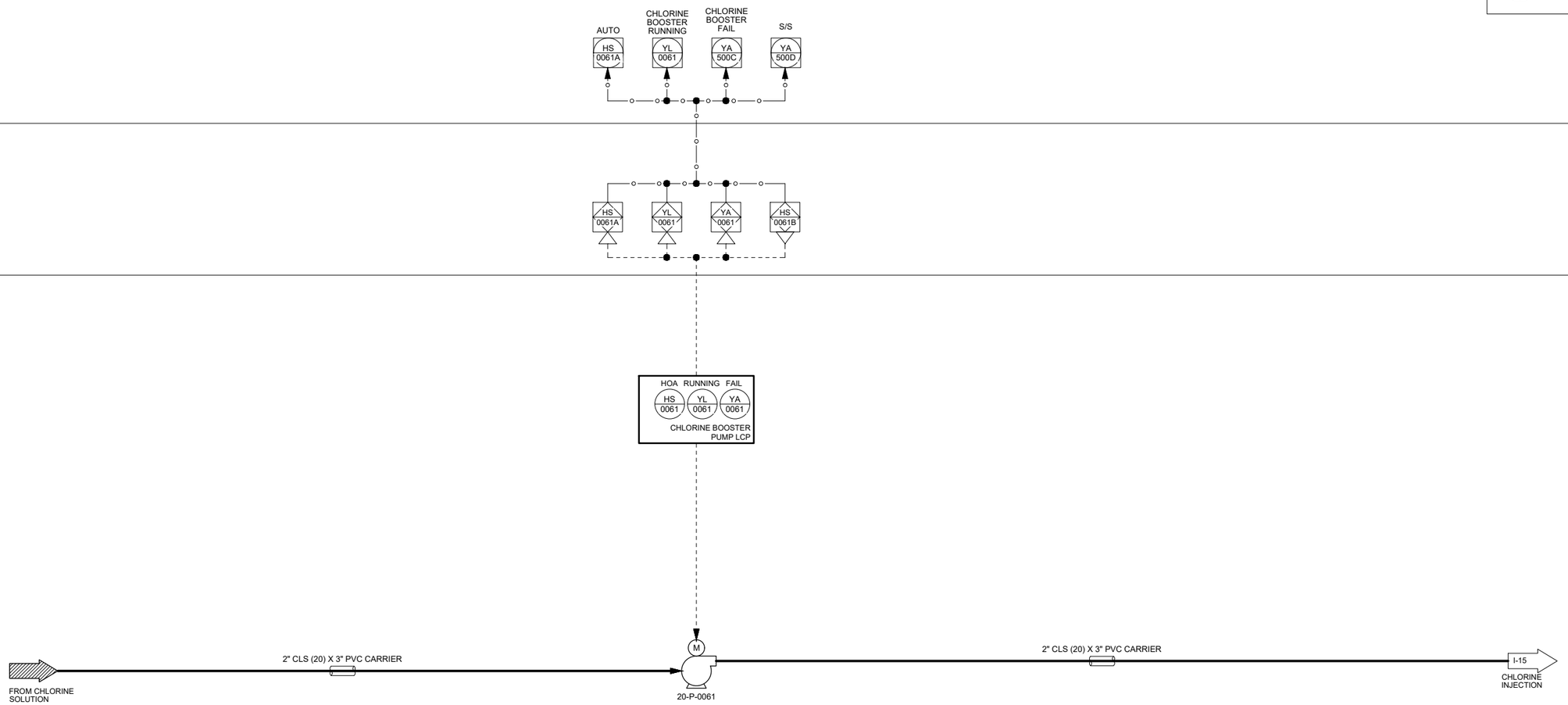
INSTRUMENTATION AND CONTROL
REUSE BUILDING NO - 2

DATE: DECEMBER 2022
PROJECT NUMBER 483-20-02

DRAWING NO.
I-16

SHEET 98 OF 126

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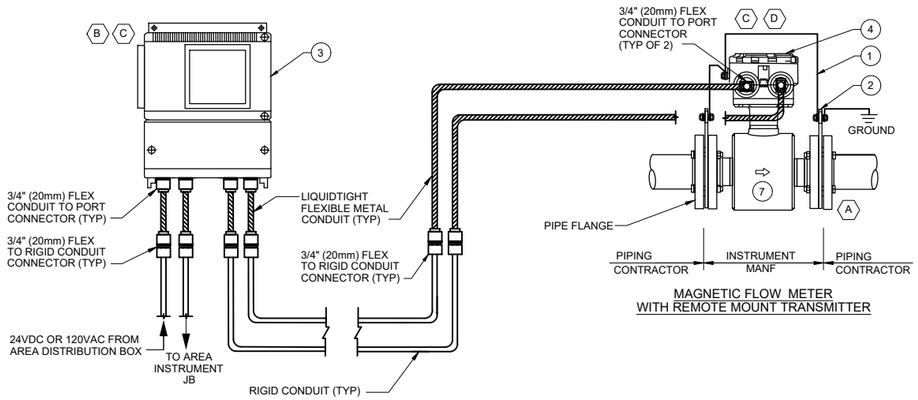
REVIEW
CHECKED D. STEFFES
APPROVED B. HERRERA

INSTRUMENTATION AND CONTROL
CHLORINE BOOSTER PUMP P&ID

DATE: DECEMBER 2022
PROJECT NUMBER 483-20-02

DRAWING NO.
I-17
SHEET 99 OF 126

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MAGNETIC FLOW METER
WITH REMOTE MOUNT TRANSMITTER

GENERAL NOTES:

1. REFER TO P&IDS AND DATA SHEETS FOR PROCESS PIPING SIZE AND MATERIAL.
2. BIDIRECTIONAL APPLICATION REQUIRES 5 PIPE DIAMETERS ON BOTH SIDES OF METER, MINIMUM. UNIDIRECTIONAL APPLICATION REQUIRES 5 PIPE DIAMETERS UPSTREAM AND 2 PIPE DIAMETERS DOWNSTREAM WITH STABLE PROCESS CONDUCTIVITY.
3. INSTALLATION OF MATING FLANGES WITH THE FLOW METER SHALL BE CARRIED OUT IN COOPERATION WITH THE PIPING CONTRACTOR USING UPSTREAM AND DOWNSTREAM PIPE REDUCERS AS NECESSARY.
4. PROVIDE MECHANICAL SUPPORT FOR ROUTED CONDUIT.

⬡ KEYNOTES:

A. GROUNDING RINGS REQUIRED FOR METALLIC AND NON-METALLIC PIPE INSTALLATIONS TO SUPPORT PROPER SOLUTION GROUNDING AND / OR LINING PROTECTION.

B. WALL OR INSTRUMENT-STAND MOUNT PER DETAIL I-948.

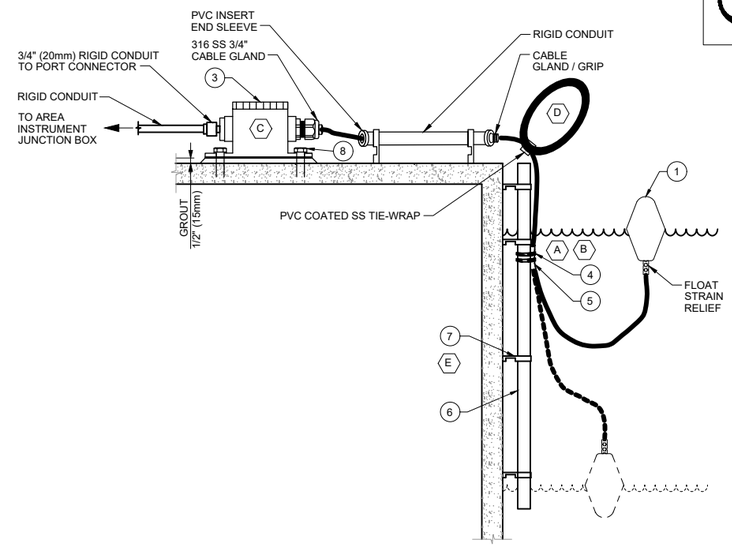
C. CONFIGURE FOR EMPTY PIPE DETECTION.

D. WHERE TEMPORARY SUBMERGENCE IS POSSIBLE, ELECTRONIC HOUSING SHALL BE POTTED AND SEALED BY MANUFACTURER PRIOR TO SHIPPING TO SITE.

E. SELECTED GROUNDING RING MATERIAL TO MATCH MEASURING ELECTRODE MATERIAL.

BILL OF MATERIALS					
ITEM	QTY	DESCRIPTION	SUPPLY	MATERIAL/RATING (WATER)	MATERIAL/RATING (CHEMICAL)
1	1	AWG # 8 GROUNDING CONDUCTOR TO GROUND GRID	CONT	COPPER	COPPER
2	2	GROUNDING RING	MANF	316 SS (E)	316 SS OR HASTELLOY C (E)
3	1	INTEGRAL TRANSMITTER WITH DISPLAY AND DUAL CONDUIT PORTS	MANF	POWDER COATED ALUMINUM	POWDER COATED ALUMINUM
4	1	REMOTE TRANSMITTER WITH DISPLAY	MANF	POWDER COATED ALUMINUM	POWDER COATED ALUMINUM
5	1	METER REMOTE WIRE HOUSING FOR REMOTE TRANSMITTER WITH DUAL CONDUIT PORTS	MANF	POWDER COATED ALUMINUM	POWDER COATED ALUMINUM
6	1 EACH	COIL DRIVE AND ELECTRODE SIGNAL CABLES (SEPARATE CABLES; LENGTH AS REQUIRED)	CONT	PER MANF SPEC	PER MANF SPEC
7	-	METER MEASURING TUBE / FLANGES (LINER PER MANF RECOMMENDATION)	MANF	304 SS	—
8	2	INSULATING GASKET	CONT	EPDM / NEOPRENE	EPDM / NEOPRENE

I-101 MAGNETIC FLOW METER
REV 010119



SUSPENDED FLOAT

GENERAL NOTES:

1. PROVIDE MECHANICAL SUPPORT AND FITTINGS FOR ROUTED CONDUIT.
2. SWITCHES SHALL BE MOUNTED AND ORIENTED IN ACCORDANCE WITH THE MANUFACTURER REQUIREMENTS.
3. WETTED MATERIALS SHALL BE CHEMICALLY INERT TO THE PROCESS.
4. REFER TO DIVISION 26 SPECIFICATIONS FOR FLEX AND RIGID CONDUIT MATERIAL AND USAGE LIMITATIONS.
5. USE PVC COATED SS TIE-WRAPS TO NEATLY COIL AND SECURE ANY EXCESS FLOAT CABLING AS SHOWN.

⬡ KEYNOTES:

A. POSITION THE ADJUSTABLE STRAIN RELIEF ON THE CABLE TO ALLOW ONE HALF THE DISTANCE OF THE DIFFERENTIAL BAND BETWEEN THE END OF THE ADJUSTABLE STRAIN RELIEF AND THE END OF THE STRAIN RELIEF ON THE FLOAT.

B. FOR SUSPENDED FLOAT, PROVIDE CABLE TIE AT MIDPOINT AND TOP OF ADJUSTABLE STRAIN RELIEF AS SHOWN, PLUS ONE CABLE TIE FOR EVERY 12" (300mm) OF CABLE LENGTH.

C. TERMINAL JUNCTION BOX SHALL BE WALL OR FLOOR MOUNTED IN EASILY ACCESSED LOCATION WITHIN 30 FEET (10 METERS) OF INSTRUMENT INSTALLATION. FOR FLOOR MOUNT PROVIDE 1/2" (15mm) THICK GROUTING. FOR WALL MOUNT, LOCATE APPROXIMATELY 36" (1 METER) ABOVE GRADE. IF AREA INSTRUMENT JUNCTION BOX IS WITHIN 33 FEET (10 METERS) OF INSTRUMENT INSTALLATION, TERMINAL BOX WILL NOT BE REQUIRED AND INSTRUMENT CABLE MUST BE ROUTED WITHOUT SPLICE OF ANY KIND.

D. MAINTENANCE LOOP SHALL INCLUDE 3 FEET (1 METER) LENGTH OF CABLE SECURED WITH PVC-COATED SS TIE WRAPS, BEND RADIUS NO LESS THAN 8" (200mm).

E. PROVIDE MOUNTING BRACKET SUPPORT FOR EVERY 3FT (1M) OF PIPE LENGTH.

BILL OF MATERIALS					
ITEM	QTY	DESCRIPTION	SUPPLY	MATERIAL/RATING (WATER)	MATERIAL/RATING (CHEMICAL)
1	1	SUSPENDED BALL FLOAT SWITCH WITH INTEGRAL CABLE	MANF	PVC	PVC
2	1	FLOAT SWITCH HOUSING	MANF	EPOXY COATED ALUMINUM	EPOXY COATED ALUMINUM
3	AR	LOCKABLE SCREW LID TERMINAL JUNCTION BOX WITH DIN-RAIL MOUNTED TERMINAL BLOCK (MIN DIMENSIONS: 2" (53mm) (h)x4" (110mm) (Ø))	MANF	NEMA 4X / GRP	NEMA 4X / GRP
4	AR	CABLE TIES	CONT	PVC COATED 316 SS	PVC COATED 316 SS
5	1	ADJUSTABLE STRAIN RELIEF	MANF	NEOPRENE	NEOPRENE
6	1	FLOAT SUPPORT PIPE	CONT	PVC (SCH 80)	PVC (SCH 80)
7	AR	MOUNTING BRACKET WITH 5/8" (16mm) SS ANCHOR BOLTS (F)	CONT	316 SS	316 SS
8	AR	SS BOLTS / ANCHORS	CONT	316 SS	316 SS

I-151 FLOAT LEVEL DETECTION SWITCH
REV 010119

Stantec

BOWEN COLLINS & ASSOCIATES

PROFESSIONAL ENGINEER No.11965314 BARBARA HERRERA 12/13/22 STATE OF UTAH

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MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

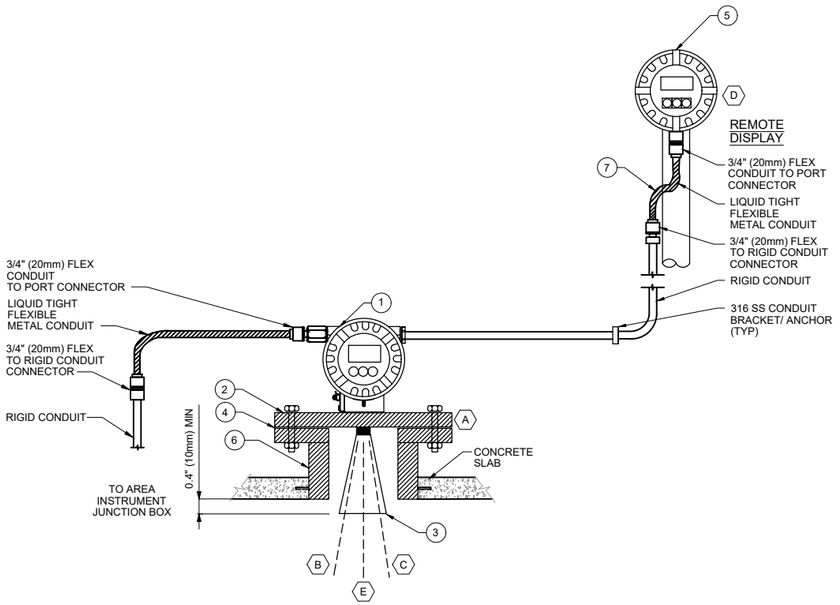
REVIEW CHECKED D. STEFFES APPROVED B. HERRERA

DESIGN DESIGN S. KEEN DRAWN P. CHOPADE

INSTRUMENTATION AND CONTROL
INSTALLATION DETAILS - I

PROJECT NUMBER 483-20-02
DATE: DECEMBER 2022

DRAWING NO.
GI-01
SHEET 122 OF 126



CONCRETE TANK - TOP MOUNT WITH LOCAL DISPLAY

GENERAL NOTES:

1. PROVIDE MECHANICAL SUPPORT AND FITTINGS FOR ROUTED CONDUIT.
2. IN APPLICATIONS WITH HEAVY CONDENSATION ANTICIPATED OR TURBULENT LIQUID SURFACE, EMPLOY MANUFACTURER RECOMMENDED LOW FREQUENCY MODEL. SELECTED WAVELENGTH SHOULD BE LARGER THAN ANTICIPATED RIPPLE SIZE.
3. VENDOR FURNISHED CABLING SHALL BE RATED WATERTIGHT AND FOR CONTINUOUS UV EXPOSURE WITHOUT DEGRADATION.
4. ELECTRONIC SUPPRESSION OF INTERFERENCE ECHOES USING MANF. TRANSMITTER TOOLS MAY BE REQUIRED.
5. REFER TO DIVISION 26 SPECIFICATIONS FOR FLEX AND RIGID CONDUIT MATERIAL AND USAGE LIMITATIONS.
6. REFER TO TANK MECHANICAL DATA SHEETS OR DETAILS FOR TANK NOZZLE SIZE AND SPACING. INSTRUMENT INSTALLATION IN THE TANK MANWAY IS NOT PERMITTED.
7. USE PVC COATED SS TIE-WRAPS TO NEATLY COIL AND SECURE ANY EXCESS SENSOR CABLING AS SHOWN.

KEYNOTES:

A. INSTRUMENT SHALL BE FLANGE MOUNTED, AT OR 12 INCHES FROM TANK WALL (BUT SUBJECT TO MANUFACTURER REQUIREMENTS) AND OPPOSITE TO ANY TOP FILL FACILITIES. FOR TANKS CONSTRUCTED OF NON-CONDUCTIVE MATERIAL, BEAM ANGLE SHOULD BE CONTAINED WITHIN THE TANK TO AVOID INTERFERENCE FROM REFLECTIVE MATERIAL LOCATED OUTSIDE THE TANK.

B. THE SENSOR HORN BOTTOM RIM SHALL BE INSTALLED NO LESS THAN 12" (300mm) ABOVE THE MAXIMUM TANK LEVEL AND PROPERLY ALIGNED PER THE MANUFACTURER'S REQUIREMENTS.

C. SENSOR SHALL BE INSTALLED SUCH THAT THE BEAM ANGLE DOES NOT ENCOUNTER ANY PHYSICAL DEVICE OR FLOW STREAM IN THE BEAM'S SENSING PATH.

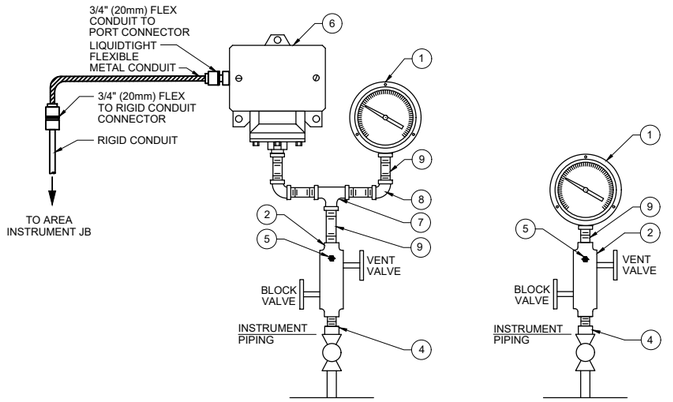
D. MOUNT DISPLAY ON STANDARD INSTRUMENT STAND PER DETAIL I-701 / 702. SUNSHIELD REQUIRED FOR OUTDOOR INSTALLATION.

E. IN THE CASE OF MEDIA WITH LOW DIELECTRIC CONSTANT (WHERE THE TANK BOTTOM IS VISIBLE THROUGH THE MEDIA AT LOW LEVELS) A MANUFACTURER RECOMMENDED REPOSITIONING OF ZERO LEVEL MUST BE OBSERVED.

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	SUPPLY	MATERIAL/RATING (WATER)	MATERIAL/RATING (CHEMICAL)
1	1	TRANSMITTER ELECTRONIC HOUSING	MANF	EPOXY COATED ALUMINUM	EPOXY COATED ALUMINUM
2	1	6" (DN150) DIA FLANGE (TAPPED TO ACCOMMODATE INSTRUMENT FITTING) AND MOUNTING HARDWARE	MANF	316 SS	316 SS
3	1	3" (DN80) OR 4" (DN100) ANTENNA HORN (LENGTH TO ACHIEVE MAX BEAM ANGLE INDICATED)	MANF	316 SS	ALLOY-400 OR PTFE
4	AR	GASKET	CONT	VITON	VITON
5	1	REMOTE DISPLAY	MANF	EPOXY COATED ALUMINUM	EPOXY COATED ALUMINUM
6	1	6" (150mm) DIA SCH 80 FLANGED PIPE SLEEVE WITH SEEP RING	CONT	304 SS	316 SS OR PVC
7	1	IN-CONDUIT REMOTE DISPLAY CABLE LIMIT ROUTING TO 66 FEET (20M)	MANF	PER VENDOR	PER VENDOR

I-202 RADAR LEVEL TRANSMITTER
REV 010119



PRESSURE GAUGE AND SWITCH

PRESSURE GAUGE OR SWITCH

GENERAL NOTES:

1. POTENTIALLY WETTED MATERIALS SHALL BE CHEMICALLY INERT TO THE PROCESS.
2. REFER TO P&IDS AND DATA SHEETS FOR PROCESS PIPING SIZE AND MATERIAL.
3. PIPING SIDE ISOLATION VALVES FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR.
4. REFER TO DIVISION 26 SPECIFICATIONS FOR FLEX AND RIGID CONDUIT MATERIAL AND USAGE LIMITATIONS.

KEYNOTES:

A. FOR AMBIENT TEMPERATURE APPLICATIONS LOWER THAN -10 degC, ETHYLENE GLYCOL FILL FLUID REQUIRED IN LIEU OF STANDARD SILICONE OIL.

B. FURNISH 1/4" (8mm) OD MALE CONNECTOR AND 1/4" OD (1.5mm WALL THICKNESS) 316SS DOWN TURNED DRAIN TUBING FOR FIELD INSTALLATION. ENSURE VENT / DRAIN IS DIRECTED TO SAFE LOCATION.

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	SUPPLY	MATERIAL/ RATING (WATER / AIR)	MATERIAL/ RATING (CHEMICAL)
1	1	LIQUID-FILLED PRESSURE GAUGE	MANF	PHENOLIC ENCASED	PHENOLIC ENCASED
2	1	1/2" (15mm) 2 VALVE MANIFOLD WITH INTEGRAL BLEED	MANF	316 SS	316 SS OR PVC
4	1	HEX REDUCING BUSHING 1"x1/2" (25mmx15mm)	CONT	316 SS	316 SS OR PVC
5	1	1/4" NPT VENT PIPE PLUG (B)	MANF	316 SS	316 SS OR PVC
6	1	PRESSURE SWITCH	MANF	316 SS	316 SS OR PVC
7	1	TEE 1/2" (15mm)	CONT	316 SS	316 SS OR PVC
8	2	ELBOW 1/2" (15mm)	CONT	316 SS	316 SS OR PVC
9	AR	1/2" MALE TO MALE NIPPLE	CONT	316 SS	316 SS OR PVC

I-301 PRESSURE GAUGE / SWITCH
REV 010119

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BOWEN COLLINS & ASSOCIATES

PROFESSIONAL ENGINEER No.11965314 BARBARA HERRERA 12/13/22 STATE OF UTAH

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MAGNA WRF REUSE PROJECT
MAGNA, UTAH

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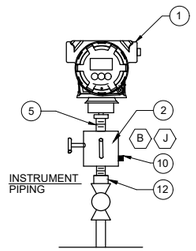
DESIGN S. KEEN
DRAWN P. CHOPADE
CHECKED D. STEFFES
APPROVED B. HERRERA
REVIEW

INSTRUMENTATION AND CONTROL
INSTALLATION DETAILS - II

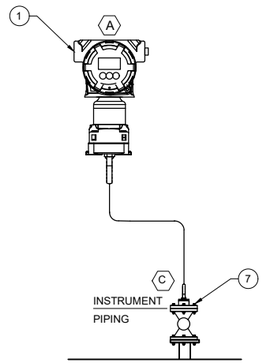
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PROJECT NUMBER 483-20-02

DRAWING NO.
GI-02
SHEET 123 OF 126

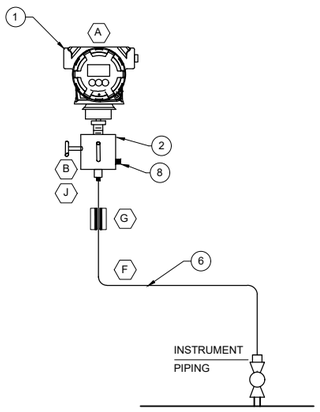
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PRESSURE TRANSMITTER



PRESSURE TRANSMITTER WITH CAPILLARY SENSING TUBE



PRESSURE TRANSMITTER- REMOTE MOUNT

GENERAL NOTES:

1. POTENTIALLY WETTED MATERIALS SHALL BE CHEMICALLY INERT TO THE PROCESS.
2. REFER TO P&IDS AND DATA SHEETS FOR PROCESS PIPING SIZE AND MATERIAL.
3. PIPING SIDE ISOLATION VALVES FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR.
4. REFER TO DIVISION 26 SPECIFICATIONS FOR FLEX AND RIGID CONDUIT MATERIAL AND USAGE LIMITATIONS.

KEYNOTES:

A. WALL OR INSTRUMENT-STAND MOUNT.

B. FURNISH 1/4" (8mm) OD MALE CONNECTOR AND 1/4" OD (1.5mm WALL THICKNESS) 316SS DOWN-TURNED DRAIN TUBING FOR FIELD INSTALLATION. ENSURE VENT / DRAIN IS DIRECTED TO SAFE LOCATION.

C. CAPILLARY DIAPHRAGM SEAL SYSTEM

D. ARMORED CAPILLARIES: 316 SS.
FLANGE: 316 SS OR HASTELLOY C PREFERRED. HOWEVER ENGINEER APPROVED FINAL SELECTION BASED ON MATERIAL CHEMICAL COMPATIBILITY.

E. FOR AMBIENT TEMPERATURE APPLICATIONS LOWER THAN -10 degC, ETHYLENE GLYCOL FILL FLUID REQUIRED IN LIEU OF STANDARD SILICONE OIL.

F. IN GENERAL, FOR GAS APPLICATIONS IMPULSE TUBING SHALL BE SLOPED UP TO THE SWITCH OR GAUGE. FOR LIQUID APPLICATIONS, IMPULSE TUBING SHALL BE SLOPED DOWN TO THE SWITCH OR GAUGE. MINIMUM APPLIED SLOPE SHALL BE 1:12 TUBING LENGTHS SHALL BE APPROXIMATELY EQUALIZED AND KEPT AS SHORT AS POSSIBLE.

G. 1/2" TUBING SHALL BE SUPPORTED / BRACED EVERY 3-FT. THERMALLY INSULATING SPACER MATERIAL SHALL BE APPLIED TO SEPARATE THE TUBING FROM THE SUPPORTS. PIGTAIL LOOP REQUIRED FOR HIGH VIBRATION INSTALLATIONS ONLY.

H. 316 SS OR HASTELLOY C PREFERRED. HOWEVER ENGINEER APPROVED FINAL SELECTION BASED ON MATERIAL CHEMICAL COMPATIBILITY.

J. VENT / DRAIN TO SAFE LOCATION (GRADE / DRAIN)

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	SUPPLY	MATERIAL/ RATING (WATER)	MATERIAL/ RATING (CHEMICAL)
1	1	PRESSURE TRANSMITTER ELECTRONIC HOUSING	MANF	EPOXY COATED ALUMINUM	
2	1	2 VALVE MANIFOLD WITH INTEGRAL BLEED	MANF	316 SS	316 SS OR PVC
3	AR	ISOLATION DIAPHRAGM SEAL; SILICONE OIL FILL FLUID (E)	MANF	316 SS	HASTELLOY C OR PVC
4	1	HEX REDUCING BUSHING 1"x1/2" (25mmx15mm)	CONT	316 SS	316 SS OR PVC
5	AR	1/2" MALE TO MALE NIPPLE	CONT	316 SS	316 SS OR PVC
6	AR	IMPULSE TUBING (1/2" (15mm) OD AND 1.5mm WALL THICKNESS) AND COMPRESSION FITTINGS (F)(G)	CONT	316 SS	(H)
7	AR	CAPILLARY DIAPHRAGM SEAL SYSTEM FLANGE (SIZED AND RATED TO MATCH ISOLATION VALVE FLANGE AND PROCESS REQUIREMENTS) WITH INTEGRAL 1/4" (8mm) ARMORED CAPILLARY TUBE (LENGTH AS REQUIRED); SILICONE OIL FILL FLUID.	MANF	316 SS (FLANGES AND CAPILLARIES)	(D)(E)
8	1	1/4" NPT VENT PIPE PLUG	MANF	316 SS	316 SS OR PVC
9	1	INSTRUMENT REMOVAL DEVICE AND 1/2" STEM	MANF	316 SS	316 SS OR PVC

I-303 PRESSURE TRANSMITTER
REV 010119

Stantec

BOWEN COLLINS & ASSOCIATES

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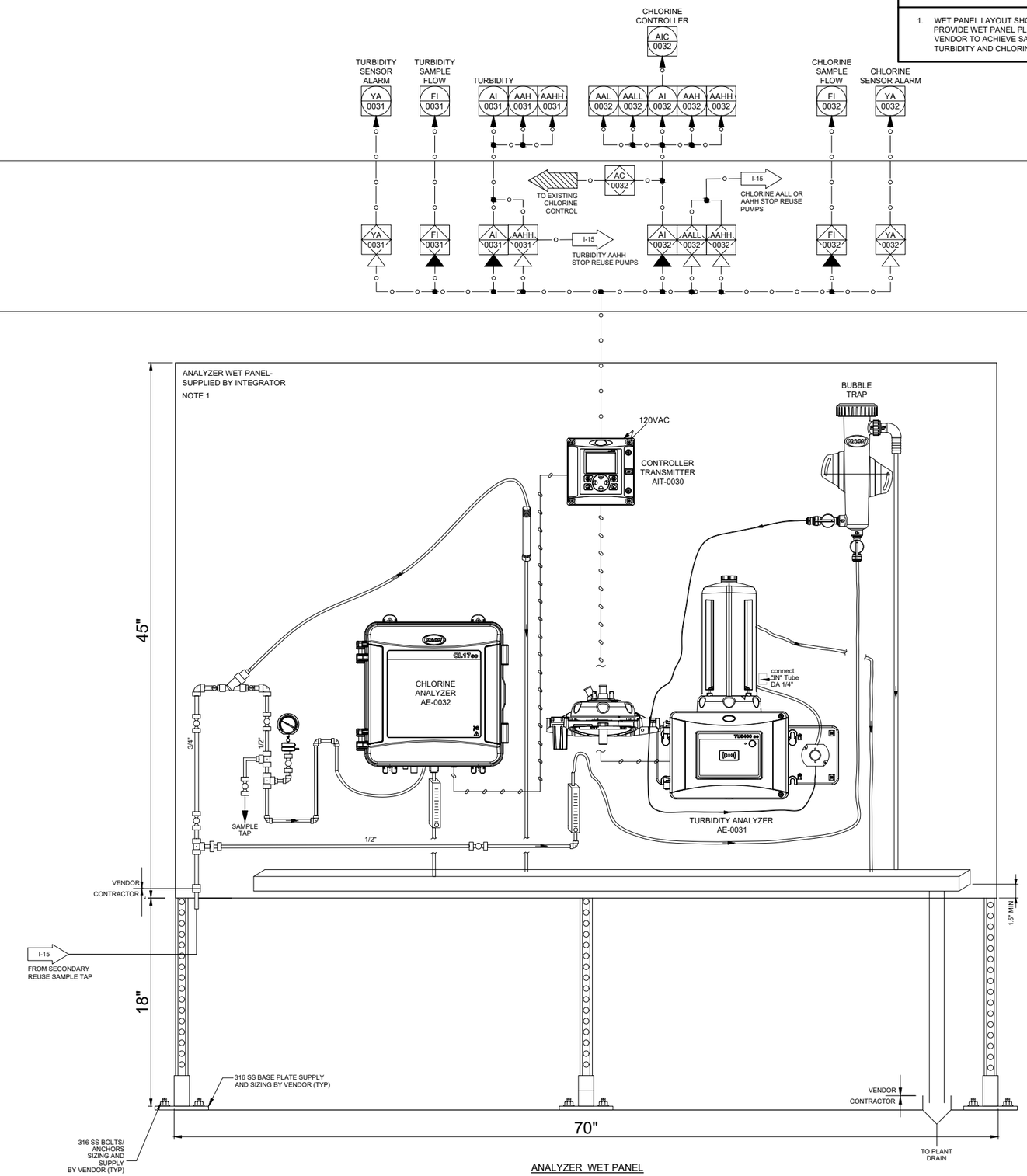
DATE: DECEMBER 2022
PROJECT NUMBER 483-20-02

DRAWING NO.
GI-03

SHEET 124 OF 126

GENERAL SHEET NOTES

1. WET PANEL LAYOUT SHOWN AS A GENERAL ARRANGEMENT. CONTRACTOR SHALL DESIGN AND PROVIDE WET PANEL PLUMBING AND EQUIPMENT LAYOUT IN COORDINATION WITH THE ANALYZER VENDOR TO ACHIEVE SAMPLE PRESSURE AND FLOW CONTROL REQUIRED FOR ACCURATE TURBIDITY AND CHLORINE MEASUREMENTS.



ANALYZER WET PANEL

Stantec

BOWEN COLLINS & ASSOCIATES

PROFESSIONAL ENGINEER
No. 11965314
BARBARA CHEROPUS
12/13/22
STATE OF UTAH

NO.	DATE	REV. BY	DESCRIPTION
			REVISIONS

MAGNA WATER DISTRICT
MAGNA WRF REUSE PROJECT
MAGNA, UTAH

NO SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING

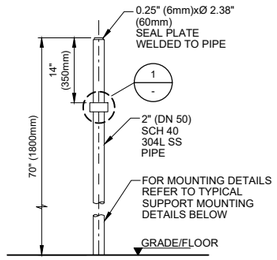
DESIGN S. KEEN
DRAWN P. CHOPADE
REVIEW
CHECKED D. STEFFES
APPROVED B. HERRERA

INSTRUMENTATION AND CONTROL
ANALYZER WET PANEL

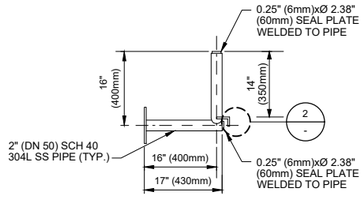
DATE: DECEMBER 2022
PROJECT NUMBER 483-20-02

DRAWING NO.
GI-04
SHEET 125 OF 126

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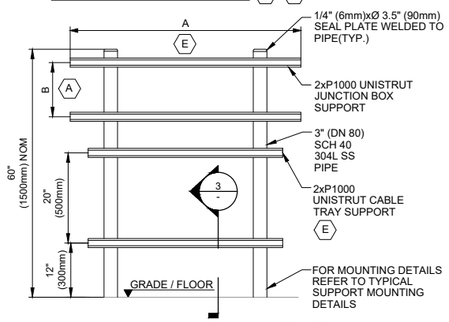


GRADE / FLOOR MOUNTED

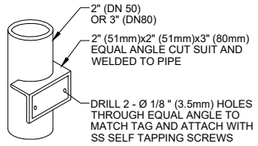


WALL / COLUMN MOUNTED

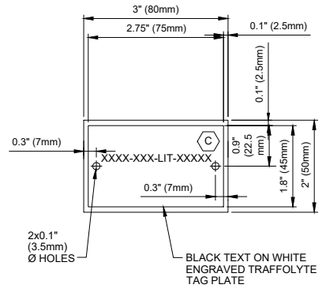
SINGLE INSTRUMENT SUPPORT (B) (F)



PANEL / JUNCTION BOX SUPPORT (B) (F)

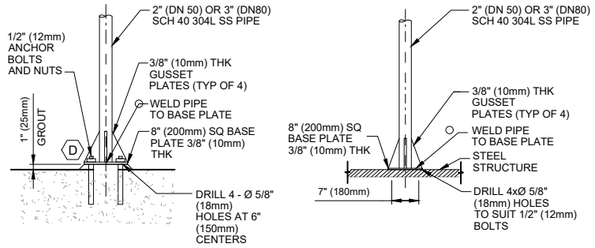


1 - DETAIL



INSTRUMENT TAG AND MOUNTING PLATE (B) (F)

2 - DETAIL



CONCRETE SLAB MOUNTING

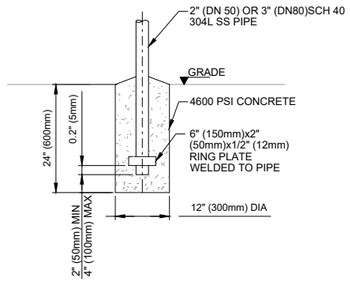
STEEL STRUCTURE MOUNTING

GENERAL NOTES:

1. INSTRUMENT DISPLAY SHALL BE SITUATED 48" (1220mm) ABOVE GRADE. REQUEST FOR DEVIATION SHALL BE SUBMITTED IN WRITING TO THE ENGINEER FOR APPROVAL.
2. REFER TO WEATHER SHIELD INSTALLATION DETAILS I-702 FOR WEATHER SHIELD SPECIFICS AND ADDITIONAL INSTALLATION REQUIREMENTS.
3. AFTER FABRICATION REMOVE ALL SHARP EDGES, BURRS ETC.
4. ALL WELDS SHALL BE 0.2" (6mm) CONTINUOUS FILLET WELDS FULL PERIMETER UNLESS NOTED OTHERWISE.
5. STANDS ARE TYPICAL; SITE MODIFICATION MAY BE NECESSARY TO ACCOMMODATE INSTALLATION.

KEYNOTES:

A. DIMENSION "B" TO SUIT JUNCTION BOX MOUNTING BRACKETS.
B. ALL HEAT AFFECTED WELD AREAS TO BE PAINTED WITH ZINC CHROMATE.
C. REFER TO PROJECT INSTRUMENT SCHEDULE FOR TAG NUMBERING DETAILS.
D. BASEPLATES TO BE FIXED TO CONCRETE USING 1/2" (12mm) 316 SS ANCHOR BOLTS (QTY=4) USING MULTI EPOXY ADHESIVE ANCHORS. IF CONCRETE THICKNESS IS INSUFFICIENT FOR MOUNTING VERTICAL BASE PLATES, EMPLOY A THROUGH BOLTED CONNECTION.
E. DIMENSION "A" LENGTH AND CABLE TRAY SUPPORT LENGTH AS REQUIRED TO SUIT NUMBER OF JUNCTION BOXES OR CONTROL PANELS.
F. SUPPORT ASSEMBLY SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.



YARD MOUNTING

TYPICAL SUPPORT MOUNTING DETAILS

3 - SECTION

I-701 INSTRUMENT STAND

REV 010119

Stantec

BOWEN COLLINS & ASSOCIATES

PROFESSIONAL ENGINEER No.11965314 BARBARA HERRERA 12/13/22 STATE OF UTAH

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NO SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING

REVIEW CHECKED D. STEFFES APPROVED B. HERRERA

DESIGN DESIGN S. KEEN DRAWN P. CHOPADE

INSTRUMENTATION AND CONTROL
INSTALLATION DETAILS – IV

DATE: DECEMBER 2022 PROJECT NUMBER 483-20-02

DRAWING NO.
GI-05
SHEET 126 OF 126

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